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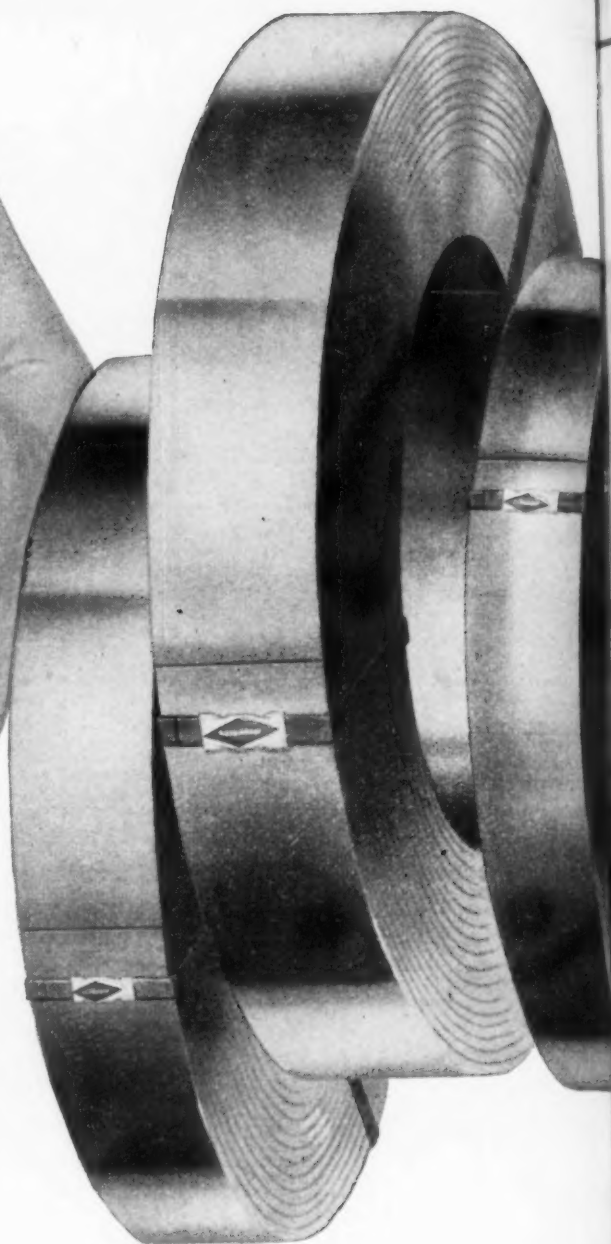
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A Woozle or a Wizzle?

FULL employment and the exciting rattle of inflationary money in many pockets has worked a profound change in the public mood. Whereas last year a Federal Reserve consumer survey showed only 35 pct believing that peak economic activity would be sustained, the most recent survey shows 55 pct confident of no setback in 1947. This dramatic swing from resignation to enthusiasm has infected the public statements of political and business leaders. A year ago the debate was whether the recession would be a depression. Today, even the slightest thought of recession or depression is looked upon in rather an embarrassed way as a throwback to a less sophisticated era—either that or some subtle form of sabotage to further the proletarian revolution.

It has all been a little like Winnie-the-Pooh and Piglet circling a spinney, first tracking a Woozle whose footprints in the snow were soon joined by those of a Wizzle. Just as their fright and consternation reached fever pitch, came the denouement. They were tracking their own footprints, and the Woozle and the Wizzle had been conjured only in overwrought imagination. "I have been foolish and deluded," said Pooh.

To judge by the most recent business reports, many an observer, like Pooh, admits to some feeling of being foolish and deluded. Employment is near 60 million and unemployment is at a nearly irreducible minimum of 1.9 million. Even though manufacturers' new orders seem to decline steadily in small increments while inventories increase, the industrial production index has sagged only a point or so. This is accounted for by a long-awaited drop in textile output, assisted here and there by stoppages induced by minor labor disputes.

Such a parade of bullish factors leads quite readily to widespread complacency and optimism. A minority opinion, however, insists that activity based so patently on vast expansion of bank credit and artificial multiplication of money supply, generates within itself certain correctives which could well be quite painful.

It is for precisely this reason that Mr. Truman's veto of the Tax Relief Bill is in such disfavor in banking circles. Criticism of the orthodoxy of the Truman administration in matters of budget policy may seem somewhat amusing in view of the decade or so of bitter criticism of Roosevelt debit financing. But it's all a matter of degree. Business has a certain sympathy with debt reduction, but not with such a terrific initial bite. If the 1948 budget remains unchanged, it might bring a surplus of from \$8 to \$15 billion. Such drastic debt reduction could constrict money supply in a precipitate manner, and could pack such a deflationary wallop as to accentuate any year-end downward business trend. Thus would "the merry-go-round slow down."

Another factor being scrutinized with care is the Federal Reserve Board's survey of consumer buying intentions. With automobiles a conspicuous exception, the survey suggests not only a decline in expenditure estimates for durable consumer goods, but a decline by comparison with actual dollar spending in 1946. Obviously, the farmer and non-durables were there first to whip off much of the ready money. This situation may well have been in the mind of Congress when it monetized some \$2 billion of soldiers' terminal-leave bonds.

The Board's survey also showed consumers so confident of the business future as to be very willing to make further drafts on savings and increase installment buying for purchases of durable goods. Nearly 40 pct indicate willingness to buy durables on credit (against 32 pct in 1946), an attitude which has some bearing on the decision of Congress to kill installment-buying regulation W (one-third-down-15-months-to-pay) over the objections of Mr. Truman and Board Chairman Eccles.

One further question mark in the trend of the internal economy is both the timing and magnitude of activating the Marshall Plan for Europe. Mr. Clayton, in his private talks with the British, can hardly be accused of not being quite frank as to the economic meaning of this Plan. It is that America should organize in Europe the defenses against an American slump. Dollar purchasing power is to be maintained to keep pace with the enormous capacity of American industry.

T. W. Lippert

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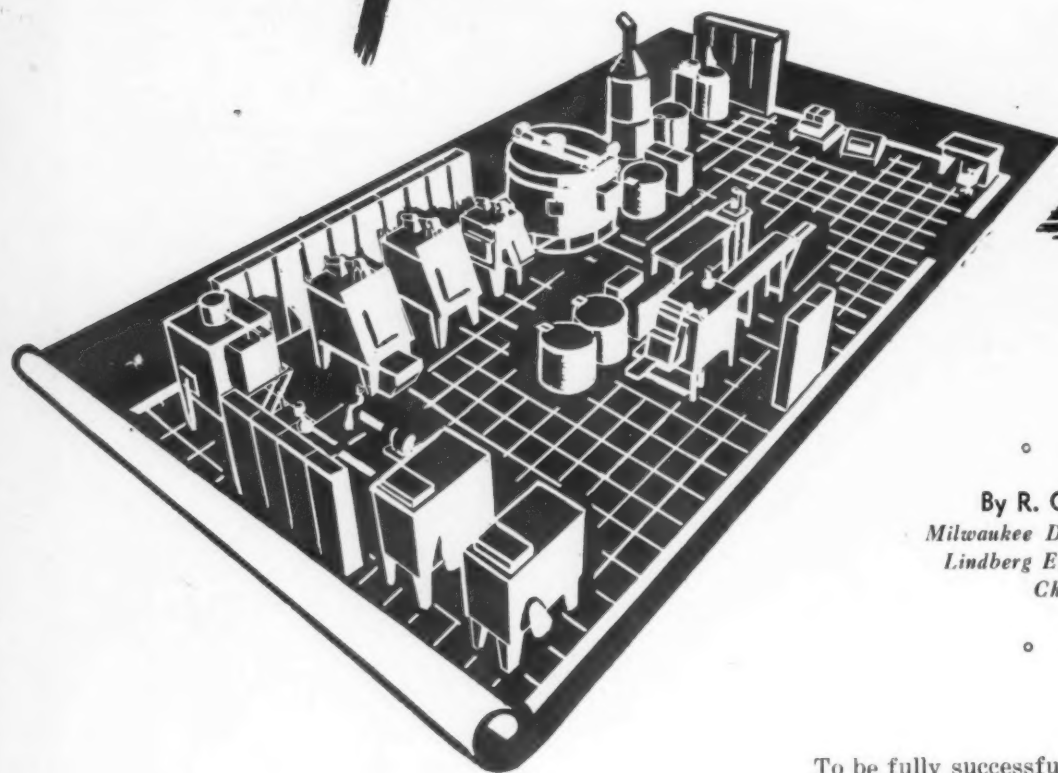
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- ▶ A new electronic testing device which determines the efficiency of automobile testing mounts has been developed by Buick engineers. The machine is used to measure friction characteristics and predetermine the life of engine mountings.
- ▶ One result that may follow recent large scale shutdowns in the auto industry is cutbacks or cancellations or orders for forging steels for crankshafts and other forged parts. No substantial cutbacks have been reported to date.
- ▶ A census by U. S. Research Council reveals that there are 158 laboratories operated by producers of vehicles and parts, rubber, and petroleum products. On the staffs of these laboratories are 1931 chemists, 281 physicists, 574 metallurgists, and 3769 engineers.
- ▶ The Census Bureau predicts an employment peak of 59.3 million jobs in 1947, or 1.3 million higher than ever before. The peak figure is one million above the May high. The present unemployed figure of 1.9 million is the lowest in peacetime history.
- ▶ The use of crushed coal instead of coke in cupola melting of iron is a possibility, should current research in the use of oxygen in such melting live up to expectations.
- ▶ Britain will take 2.25 million short tons of Swedish iron ore during the next 12 months under a new contract. The price is up \$1 per ton, 83¢ of which is to cover a change in the exchange rate.
- ▶ Building and civil engineering work to the extent of \$300 million will be carried out in British power stations during the next two years to help bridge the gap between supply and demand.
- ▶ Recent growth of the plastics industry is indicated by the \$50 million that has been spent in this country on synthetic resin research since 1939, by the trebling of technically trained specialists in the field in the past eight years, and the estimated \$100 million to be spent by producers on expanding facilities by the end of 1948.
- ▶ Producers of engineered metalworking equipment are complaining about the increasing number of factfinders from overseas that arrive in their works gathering information—asking for highly specialized engineering data. Too frequently these visits do not result in actual orders.
- ▶ Production of plate glass is being resumed at the Ford Rouge plant after a 14-month shutdown. A shortage of soda ash caused the shutdown.
- ▶ Pratt & Whitney will start immediately to develop its Rolls-Royce jet engine rights, on the high powered Nene engine. Two pilot models are expected to arrive in this country next month, and a technical expert from the English firm has been assigned to the Connecticut plant.
- ▶ The shortage of light gage steel sheets is growing even more acute. More companies than ever before are being driven to the gray market as their regular suppliers have cut them off.
- ▶ General Motors expects to ship 437,000 replacement engines during 1947. This is more than ten times the 1941 figure, but will not meet the demand. Total shipments of replacement engines by the "Big Three" auto makers this year are expected to exceed one million.
- ▶ Use of lead for metallizing, heretofore limited on some applications because of the permeability of sprayed metal deposits may be increased as a result of some promising tests now being made in which the lead is shot blasted after application, by round steel shot.
- ▶ National Steel has signed a \$4 million contract with Air Products Co. under which the latter will construct a plant at Weirton to produce 300 tons of oxygen daily for iron and steelmaking use. Construction is expected to take 18 months.
- ▶ France and Belgium are reported to be dominating the Argentine aluminum business, formerly a British market. American producers are being undersold by the European competition.

Planning

a Toolroom H



By R. C. ONAN

Milwaukee District Manager
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THE purpose of this article is to present the various factors underlying the planning of a toolroom heat-treating department. While considerable attention is ordinarily given to the selection and purchase of furnace equipment proper, in many instances the accessory equipment is slighted and the complete installation suffers as a consequence.

As part of these remarks, diagrams of several typical modern tool heat-treating layouts are presented (see part II of this article in subsequent issue) with explanations as to the reason for selection. In many shops tool and production heat treating are carried out in the same equipment and this overlapping of function is recognized and discussed. Since cost is always a factor in planning a heat-treating installation, the approximate prices of the various layouts are given so that their suitability to a situation may be appraised.

It is important to recognize the progress made in the last several years in furnace equipment, atmosphere generating units, quenching equipment, and procedure. The astute buyer will want his installation to be representative of the most advanced practices.

To be fully successful, the toolroom heat-treating installation must be considered as a unit made up of various components which complement each other. One of the most neglected phases of tool heat treating is proper quenching facilities—without which the finest of furnace equipment is badly handicapped. Oil and brine quenching equipments of advanced types are not always sufficient, other methods such as time quenching and quenching in molten salt are practical adjuncts in the toolroom shop.

Normally, little consideration is given to such apparently simple items as tongs, yet the use of proper tong in handling a fussy die will often spell the difference between a good and poor job of hardening. But regardless of all precautions, distortion will occur, and when it does the heat treater must have available a good straightening press or perhaps an acetylene torch for straightening by means of spotting the work with the torch flame.

The purpose of the following general remarks, therefore, is to set forth the equipment requirements of good tool heat treating so that those who are planning an installation for the future may have an accurate list of necessities, their uses and comparative benefits, approximate prices, and suggestions for department layout. A detailed description of these factors, associated with specific production requirements, will be presented in the second part of this article.

m Heat-Treating Department

How much will the equipment cost? How much space will be needed? What size furnaces will be required? These and other practical questions are answered in this two-part article. Factors influencing the choice of equipment used in setting up, or reorganizing, a toolroom heat-treating installation are considered from the standpoint of an accurate list of equipment requirements, uses and comparative benefits, approximate prices and suggestions for department layout. In this first part of a two-part article, the author discusses various types and sizes of heat-treating and brazing furnaces and points out their relative capacities and applications.

The simplest tool heat-treating layout consists of a hardening furnace, tempering furnace, pot furnace, suitable quench tanks, and other accessories. Hardening furnaces of most manufacturers are available in fairly uniform sizes. A typical list of furnaces for use at 2000°F max, showing working dimensions, is as follows:

- 10 in. wide x 18 in. deep x 10 in. high;
- 15 in. wide x 30 in. deep x 12 in. high;
- 18 in. wide x 36 in. deep x 18 in. high;
- 24 in. wide x 36 in. deep x 18 in. high;
- 24 in. wide x 48 in. deep x 20 in. high.

It should be noted that the hardening furnaces discussed throughout this article are of controlled atmosphere type.

The 2000°F range of the furnaces listed will enable the handling of all steels except for the high speed and most hot work steels which harden at temperatures in excess of 2000°F.

Selection of Proper Furnace Size for 2000°F Max

It is not possible, generally, to predict with absolute accuracy the size of parts which are to be heat treated. If the work is the average run of tool and die sections, the optimum size of furnace for most shops in the 2000°F max type is a furnace approximately 15 in. wide x 30 in. deep x 12 in. high. An alternate size, almost as popular, is 12 in. wide x 24 in. deep x 10 in. high. If there is any question as to the capacity of the smaller furnace, it is safest to select the larger, because the difference in total price between the two sizes is approximately only 15 pct. The 15 x 30 x 12-in. unit provides 450 sq in. of hearth area as against 288 sq in. of hearth area in the 12 x 24 x 10-in. furnace. Thus, a 15 pct additional investment provides approximately 60 pct more hearth area.

Most shops will occasionally have long or bulky parts impossible to handle in one of the furnace sizes listed. Obviously, if these unusual parts are handled only a few times during the year it is

best not to take them into consideration in selecting furnace sizes. Such items are better sent to a commercial heat treater who has larger equipment available at all times.

The next size above the 15 x 30 x 12-in. furnace is 18 x 36 x 18 in. In some cases the type of work to be handled will necessitate the selection of the 18 x 36 x 18-in. size, but these are only rare occasions in average tool and die work, except where molds or large forming-dies are handled, which will obviously modify furnace requirements. This size likewise comes into greater demand when the department is called upon to handle production hardening which will be discussed in greater detail in another section of this article.

When the problem is the selection of a 15 x 30 x 12-in. furnace or an 18 x 36 x 18-in. unit—with no plain evidence that the larger furnace is required—it should be remembered that the door

FIG. 1—A rotary hearth furnace equipped with a single door through which work is charged and removed.



opening of the smaller furnace is 15 x 12 in. or 180 sq in. of area from which heat will radiate on the man when the door is open, whereas the larger furnace has an 18 x 18-in. opening or 324 sq in.—almost twice the area. It is obvious that the larger furnace will be the hotter to work. A thumb rule here is that it is better to use two small furnaces than one large unit.

Since the 2000°F furnace in the small shop doubles as a preheat furnace for high-speed steels, this factor will have some influence on the size selection. Preheating of high-speed steel at 1500° to 1600°F will require two to three times as long as the high heat operation. If the high-speed work is in such volume that it is necessary to run continuously on it, then consideration must be given to providing a preheat furnace in addition to a 2000°F furnace for other tool and die work.

Selection of High-Speed Furnace for 2500° F Max

In considering the high-speed furnace it should be borne in mind that toolroom heat treating is being discussed, and not heavy high-speed tool production in a tool manufacturing plant. The average toolroom heat-treat shop will be called upon to harden reamers, drills, tool bits, form cutters, and the like, and in most cases a relatively small high-speed furnace will suffice. The length of such parts as drills and reamers will influence the size of the furnace to be used. High-speed furnaces are generally available in the following range of sizes:

6 in. wide x 12 in. deep x 5 in. high
10 in. wide x 18 in. deep x 8 in. high
12 in. wide x 24 in. deep x 10 in. high
15 in. wide x 30 in. deep x 12 in. high
18 in. wide x 36 in. deep x 18 in. high
24 in. wide x 36 in. deep x 18 in. high

In 90 pct of all cases one of the first three sizes listed will handle the job, and the most popular of the three sizes is the 10 x 18 x 8-in. furnace. One consideration which hinders the use of the 6 x 12 x 5-in. unit is where the shop runs high carbon, high chrome and similar die parts. In such cases the preheat is used and the dies transferred to the high heat for finishing, the same as for high-speed steel. Thus, while it is not wise to go larger than needed on the high-heat furnace, it is well to consider that it may be used for high carbon, high chrome and hot-work steels and the size should be such as to accommodate these parts (which will average much heavier than the usual run of high-speed parts).

Another factor is that the high-heat furnace can be called upon to operate in the same range as the preheat (namely 1300° to 2000°F) and will, therefore, be able to help out when a quantity of low temperature hardening steels is to be run.

Likewise, stainless steels harden at temperatures from 1850° to 1950°F and rather than tie up the preheat furnace at these temperatures, the high-heat furnace can be conveniently used when it is not busy on high-speed work.

Selection of Toolroom Tempering Furnace

In modern practice no attempt is made to utilize radiation heating for tempering, since forced

convection heating is vastly superior in the temperature range in which tempering is carried out, and is so dependable that heat treaters are loath to trust their work in a furnace of the old type.

Two general types of forced convection tempering furnaces are available: (1) The toolroom type with front opening door equipped with several shelves on which work can be set alone or in perforated baskets. This furnace has the advantage that individual parts can easily be charged

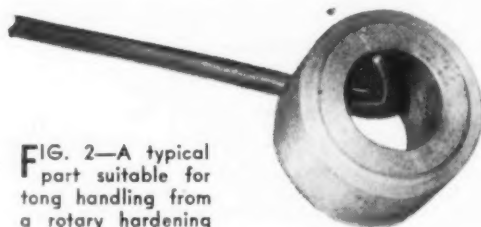


FIG. 2—A typical part suitable for tong handling from a rotary hardening furnace.

and unloaded—and being on shelves all parts are always clearly visible. (2) The vertical type, which in the smaller sizes will handle tool work, does not offer the convenience of the toolroom furnace since the work is handled in baskets and it is somewhat more difficult to charge and unload where individual parts are being processed. On the other hand, where many small or medium size pieces are handled, the vertical type will generally prove best.

The toolroom or box type of tempering furnace is available in the following general sizes:

12 in. wide x 16 in. deep x 18 in. high
15 in. wide x 24 in. deep x 18 in. high
20 in. wide x 24 in. deep x 20 in. high
24 in. wide x 24 in. deep x 24 in. high

Unless the work is unusually bulky or heavy, there is seldom any reason for going to a size larger than the 15 x 24 x 18-in. furnace for general toolroom purposes.

It is always better practice, if there is some doubt as to the production capacity of a given size tempering furnace, to select two small tempering furnaces rather than one large unit. When it is considered that there will be a good deal of variation in drawing temperatures, the reasons for this are obvious. Very often the heat treater will have rush batches of carbon tool steel and high-speed steel at the same time. All he can do is draw the carbon and allow the high-speed steel to remain in the 400° or 500°F draw until the carbon steel is finished, then raise the temperature to 1050°F or so for the high-speed draw. When this is done his furnace is tied up for quite a few hours, as he will no doubt wish to double draw the high-speed parts.

Where production of high-speed tools is continuous—and carbon and oil hardening steels are likewise in fair quantity—it is wise to definitely allow for two tempering furnaces in making the toolroom heat-treating layout. In this way one furnace can be held somewhere near 400° to 500°F to take care of the carbon and oil hardening steels and the other can be run at 1000°F or

so to handle the high-speed, high carbon-chrome or hot-work steels. Where mold dies of hot-work steel are being heat treated, adequate tempering capacity is very much a necessity since these parts are often drawn for 24 to 36 hr.

It should be borne in mind that there is a growing acceptance being accorded to low temperature preheating of die steels. Many plants make a practice of pre-heating fussy work at 600° to 800°F in a forced convection furnace to hold distortion to a minimum. This is another



FIG. 3—Typical parts suitable for handling on pans when using the rotary hearth hardening furnace.

reason for allowing adequate tempering furnace capacity in making the original layout.

Production Work and Tool Heat Treatment

In many shops it is necessary to heat treat a certain amount of production work in the same furnace equipment as is utilized for tool work. A discussion of production heat treating as such is beyond the scope of this article; however, if there is a possibility that the tool heat-treating equipment will have this double function, this fact should be given consideration in the original layout.

Any estimate on the production capacity in pounds per hour of a given size furnace is not strictly reliable unless the type of work, its size, weight, etc., be considered. As an example, fewer pounds of springs will be produced per hours than of gear blanks whose density is obviously higher.

Many systems have been proposed for estimating the productive capacity of box type or flat hearth furnaces such as used in tool heat treating, but none of the systems will give consistent results because of the infinite variations of work, weight, shape, and heating time.

The following figures are the result of observation and can be used for estimating production capacity where work is of moderate weight ($\frac{1}{2}$ in. thickness of section and up):

Furnace Size	Lb per hr @1500°F
10 x 18 x 10 in.	30 to 40
12 x 24 x 10 in.	40 to 50
15 x 30 x 12 in.	50 to 80
18 x 36 x 18 in.	80 to 100

Tilting Hearth-Type Furnace

A variation of the flat hearth furnace is that which has a tilting hearth so arranged that work can be dropped direct from the furnace chamber through a chute into the quench. This simplifies the handling of small parts and has the advantage of producing bright work since air does not contact the parts while they are being quenched. Because work is kept clean and bright, the cleaning of intricate parts is simplified considerably. Heavy work which would be nicked in dropping into the quench basket cannot be run in this manner.

The tilting hearth furnace can be used for tool and die and other heat-treating operations as desired, since the chute is covered automatically when the hearth is lowered to its normal position. Where it can be anticipated that small parts will have to be hardened in moderate quantity by the toolroom heat-treating department, the 15 x 30 x 12-in. furnace can be utilized. This feature adds approximately 30 pct to the price of the furnace. It can be obtained in any of the sizes of 2000°F furnaces to and including 18 x 36 x 18 in.

Rotary Hearth-Type Furnace

When the production of parts other than tool and die work consistently comes into the range of 100 to 150 lb per hr, consideration can be given to the rotary hearth furnace as shown in fig. 1. This unit consists of a circular hearth approximately 48 in. diam in the small size. The furnace is generally equipped with a single door and work is charged and removed through this one door. Speed of hearth rotation is adjustable so that the proper heating cycle for the parts being run can be readily obtained and maintained. This furnace is particularly suitable for work handled in quenching jigs or machines.

Work of substantial weight or bulk can be individually handled with tongs or on pans. Small parts are best handled on pans. Fig. 2 shows typical parts for tong handling, and fig. 3 pan handling.

The rotary hearth furnace fills an important gap between flat hearth units which have a nominal capacity of 100 lb per hr and conveyor or belt-type furnaces, the smallest of which will handle 200 lb per hr.

While the rotary hearth furnace is not in the category of true toolroom furnace equipment, it is mentioned here so that those who have the double barreled problem of tool work and production work in the same layout may have some suggestions for an approach to their particular operations. This situation is not at all uncommon.

Furnace Brazing

The joining of parts by means of silver solder at approximately 1200°F, or copper at approximately 2000°F, is coming into increasing importance. In order to take advantage of brazing it is practically always necessary to modify the part design so that the brazing material will flow properly and make a successful joint.

Even with the parts properly designed for brazing, a certain amount of experimental work

is necessary to determine brazing technique in the furnace proper. Among the questions which often must be answered are (1) how to load to hold distortion to a minimum, (2) how parts should be placed in the furnace to obtain best flow of brazing material and hold their relative positions, (3) amount of brazing wire or shim stock to be used and where it should be placed on assembly, and (4) temperature to be used for optimum results.

The answers to these and similar questions can only be obtained through processing of actual samples of the work. Where parts to be brazed are few, the brazing furnace manufacturer will cooperate to help establish techniques by running parts in experimental furnaces set up in his own plant for just such purposes. Where experimentation is continuous, the plant generally wants to have its own experimental brazing furnace available.

If the plant cannot afford to purchase experimental brazing equipment, it is possible to purchase the high-speed hardening equipment in approximately same sizes previously listed (under the heading "Selection of High-Speed Furnace for 2500°F Max") with cooling chamber and other accessories so that brazing can be done experimentally as well as in small production batches. Parts to be brazed are loaded on trays which are pushed into heating zone of furnace. When the brazing material has flowed, the intermediate door is opened and tray is pushed into the cooling chamber where parts cool in prepared atmosphere so that they come from processing clean and bright.

The cost of a brazing furnace addition is approximately 80 pct of the cost of a high-speed furnace proper—and the use of this feature does not detract from the quality of the high-speed tools run in the furnace.

Another type of work for which the high-speed furnace with cooling chamber can be profitably utilized is the heat treatment of air hardening steels either of the high carbon, high chrome type, hot-work, or medium chrome air hardening steels. In the treatment of such work, scaling in air cooling is entirely prevented, since the parts are pushed into the cooling chamber where they cool in a prepared atmosphere, the same as brazed parts.

Similarly, high-speed parts of small to medium section can be quenched in the cooling chamber and still develop top hardness. Where heavy sections are being handled and top hardness is necessary, the quench should be in lead or molten salt to prevent cracking.

One reservation should be made here regarding the use of the all-purpose brazing furnace for both high-speed heat treating and brazing. The size of the parts to be brazed will determine the size of furnace necessary, but where the brazing furnace exceeds 15 x 30 x 15 in., the heat treatment of high-speed steel is hazardous as the work chamber is so large that the steel may be near heat before the chamber is thoroughly purged of air which infiltrated when the door was opened for charging. Thus, if the steel is above a red heat and the atmosphere is not thoroughly purged, decarburization can take place. While careful operation will help reduce this danger, it is better to recognize it in the original planning if at all possible and where it is found that the brazing furnace must exceed the 15 x 30 x 15-in. limit mentioned, then it is wise to consider a separate small high-speed furnace.

In a subsequent issue the author will present a study showing several suggested toolroom heat-treating department layouts correlated with capital cost and space requirements.

Topaz Improves Properties of Refractory Materials

USE of topaz in furnace refractories to develop higher strength and greater load-bearing capacity in kilns and furnaces was discussed recently in a paper entitled "Topaz as an Admixture in Refractory Concrete," presented before the American Ceramic Society by Frank E. Lobaugh, technical service director, Luminite Div., Universal-Atlas Cement Co. The author stated that recent investigations revealed that the addition of finely ground topaz, which was said to be economically practical, considerably improved refractory quality, yielding a denser, less friable concrete for hearths and floors where temperatures are between 1600° and 2000°F.

Topaz contains about 14 pct fluorine, and when heated to 1600°F the fluorine reacts with the silica in the cement, in the aggregates, and in the topaz itself, to form a glass and silicon tetrafluoride. The glass remains in the mass to form a dense, hard concrete and the silicon tetrafluoride is driven off. Increase in strength was

said to be dependent upon the amount of topaz admixture, the firing temperature and the duration of firing. Below 2000°F, maximum strength was obtained by adding a portion of topaz equal to the weight of the cement. At 2000°F a portion of the topaz equal to three fourths the weight of the cement gave high increase in strength. Four days firing at 1600°F gave strengths comparable with the strengths of specimens fired 24 hr at 2000°F and also those of specimens fired 6 hr at 2200°F.

It was also found that by introducing free silica in the form of silica flour, the action of fluorine on the silica is intensified. The author stated that silica flour may be substituted for half the topaz admixture up to 2200°F, reducing the cost of additives. The tests indicated that a mixture with topaz only as the additive has good nonspalling characteristics, while panels containing silica flour showed excessive cracking in spite of the low spalling loss.

Photo - Projection Inspection And Layout

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THE photo-projection inspection and layout method described in this article was conceived during the early period of tooling for the war effort, as a simpler and faster method of laying out intricate castings than the usual method of caliper and height gage on a surface plate. The great quantity of castings involved, with their multiplicity of bosses and undercuts, made a preliminary inspection and layout necessary to obviate the expenditure of costly preliminary machining on castings which would later prove defective because of one or more misplaced bosses, a thin wall, etc.

The photo-projection method is essentially one of projecting layout drawings by optical means onto the surfaces involved. While projection-inspection utilizes photography in its initial setup, and the projection of an image while working, it should not be confused with the projection of templates¹ as worked out by the aircraft companies during the war. The object of this method

¹"Photographic Reproduction as an Engineering Tool," THE IRON AGE, Feb. 6, 1947, p. 60.

and the means utilized are truly three-dimensional in character.

The plant was confronted with the layout of castings varying in size from an approximate 6-in. cube to a 3-ft cube. The materials were aluminum alloy, bronze, and cast steel, and the method proved to be applicable to any of these materials.

The project started with the proposal of a methods supervisor that perhaps instead of making a trial baseline and proceeding to check bosses and bores therefrom, it should be possible instead to project an overall picture of the casting and choose the optimum placement of machining forthwith. The idea, as developed, is simply to project full size layouts on the principal surfaces and orient the casting or other object to conform.

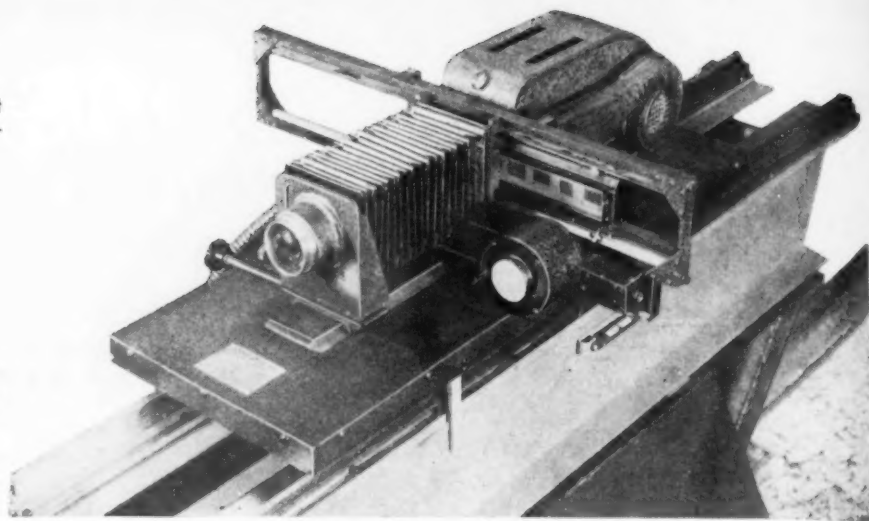
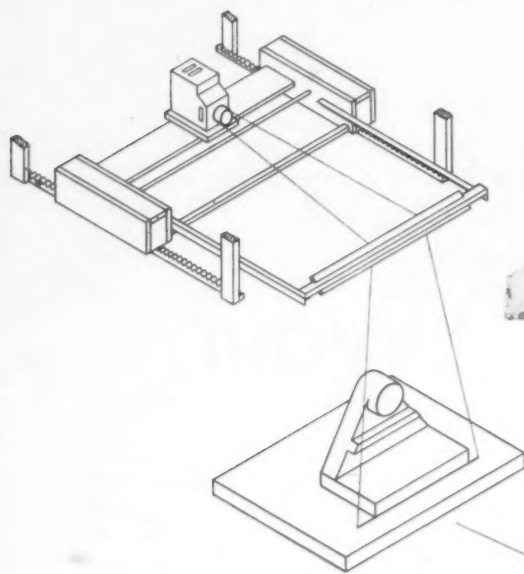
A new, simple and rapid method of inspecting and laying out intricate castings is described herein in detail for the first time. The method involves, essentially, the accurate projecting of layout drawings by optical means onto the surface of a casting. It differs in many respects from previously described photographic methods, particularly in the use of a light wand for establishing a base line for the casting to be inspected.

This is a matter of judgment requiring only a moderate amount of experience. Having made the alignment, the operator merely scribes baselines in the required two or three planes so that the casting can be properly positioned in the first-operation jig or fixture.

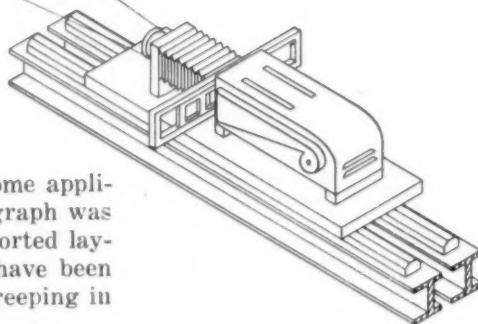
An experiment in projecting a photo-layout on a casting demonstrated that the images on the casting were still readily discernible under a reasonably low level of illumination so that there would be no need to grope around in the dark. The image, however, was dimensionally accurate in only one plane, and the surface of the casting had to coincide with this plane for accurate checking.

By using a relatively narrow angle of projection, that is, a long throw for a given projected image size, and by stopping down the lens, a considerable depth of focus was attained. Consideration was then given to a method of preparing the initial layout drawings with certain lines shrunk in size for planes behind the mean plane and enlarged in size for planes forward of the mean plane. This idea for creating a three-dimensional behavior worked well for the smaller,

BELOW
FIG. 1—Basic arrangement of projector, light wand and inspection pedestal of the photo-projection setup.



ABOVE
FIG. 2—Close-up of the projector. The entire projector follows the optical wand by rolling on a pair of ground V and flat ways.



less intricate castings and may have some application. However, even though a nomograph was prepared to assist in making these distorted layout drawings, the drafting job would have been tremendous and the chance for errors creeping in would have been too great.

A bit more thought on the matter resulted in the rather obvious conclusion that the attention of the operator would normally be directed to only one plane in the object at any instant. If the operator could readily select the plane of true projection, it was reasoned that accurate layout checking could be accomplished progressively from front surface to rearward surfaces and all important areas or projections on intermediate surfaces in between. From this conclusion the final principles of operation were soon worked out.

The projector, shown in figs. 1 and 2, is mounted on a carriage fitted to accurate ways so that it can be driven forward and back by a motor drive through a distance equal to the maximum depth of any casting that might be encountered; in the particular instance about 3 ft. The reversing switch for this motor is located conveniently at the inspection pedestal shown in fig. 8.

Another lightweight carriage is mounted on ways over the inspection pedestal near the ceiling and caused to move forward and back in unison with the projector through a selsyn servo tie. This carriage can be seen in fig. 1 and in detail in fig. 3. It is conceivable that the tie-in might also have been accomplished mechanically by chain, wire, or rod, but our projection distance was as great as 25 ft, and a subsequent selection

of several fixed projector base locations dictated the selsyn drive as being the simplest and most flexible for the case in hand.

On this carriage a small secondary projector, visible in fig. 1, is arranged to project a vertical thin wall or ribbon of light which is preadjusted to coincide with that projection plane where the layout images would be dimensionally true. Operation of the projection drive switch lever forward or back moves the ribbon of light from above (called the light wand) forward or back in unison with the projector. If the light wand falls along the front surface of a casting, the layout image is accurate for all important dimensions on that surface. If the wand is moved to cast its beam along an intermediate plane, perhaps a side projection or an internal boss, the layout lines falling on that intermediate surface are accurately indicated—and so on for all important surfaces from front to back that are accessible from the front.

The refinements in the design of this device complete the description of this photo-projection method. The inspection pedestal table is made rotatable with indexing intervals or detents corresponding to four sides of a cube. The projector is provided with an automatic selector for

slide position so that by push button selection the correct layout image can be selected for each of the four sides of the object under inspection. By this means, certain areas not readily viewed from one position can be checked from an alternate position. The accuracy of layout is maintained by providing that corresponding views on the projection slide are positioned in the projector so as to register to a common baseline. A limited lateral movement of the inspection table takes care of lateral deviations as the object is rotated from one 90° position to the next. The final combination of elements that make up the photo-projection scheme, projector, inspection pedestal, and light wand carriage are shown in fig. 4.

The preparation of the layout drawings became a rather simple matter after the above ideas were worked out. A small crew of draftswomen makes accurate layouts on white bristol board, mostly full size, with all line work done in black India ink. These layouts are essentially copies of manufacturing drawings wherein each of the views is drawn on separate layout sheets but derived from the customary orthographic projections. A baseline is established on each layout so that the group can be accurately positioned one at a time on the photographic easel. To aid the inspector in applying the layouts, all lines representing machining are drawn as solid lines while all outlines representing casting surfaces are drawn as dashed lines.

The photographing of these full-size inked layouts to make the projection slides introduced a number of new problems. It was decided that no more than a 25 times reduction was feasible in the photographed slide image if projection lens aberrations, emulsion grain, and mechanical alignments were not to become too critical. It was soon evident that film images would be un-

satisfactory. For instance, it was discovered that the normal range of humidity conditions at the plant would alter the film slide dimensions about 1 pct, which at a maximum magnification of 25 diam was greater than could be tolerated. Glass plates were the obvious alternative and especially so when it was found possible to secure photographic plates measuring 2x10 in. and coated with a high contrast emulsion. This size slide permits up to six accurately positioned views, each measuring 1½x1½ in., as shown in fig. 5.

Having arrived at a convenient image size, the camera design was next considered. To make the most use of the image area it was decided to grade the several hundred different layouts into five different size groups and photograph each group at a fixed camera distance that would afford a more or less complete filling of the assigned image area of 1½x1½ in. This accounted for the later selection of five fixed projector base positions described earlier. By this procedure, the smaller castings are afforded an enhanced image accuracy and a higher level of projected line intensity.

The modified camera that was evolved is illustrated in fig. 6. It is a Kodak Medalist to which a special back has been fitted. The unexposed glass slide fits in a carrier frame which is driven by a rack and pinion connected to a detent or latch which in turn controls the lateral spacing of up to six views or exposures. It will be noted in fig. 2 that the projector has a similar carrier frame for the finished slide which moves on machined guides and is remotely controlled at the inspection pedestal position by the push buttons described earlier. The indexing intervals, of course, are identical to those existing in the camera.

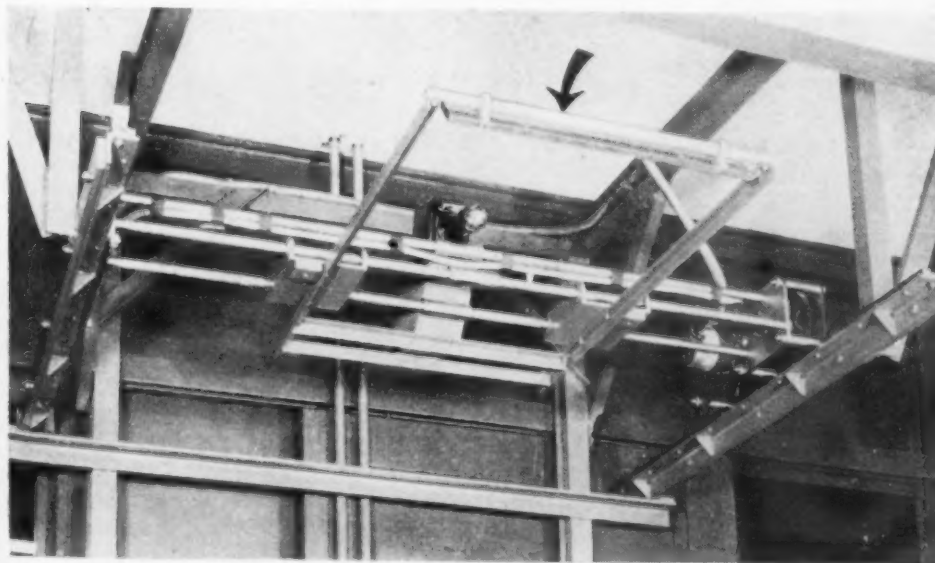
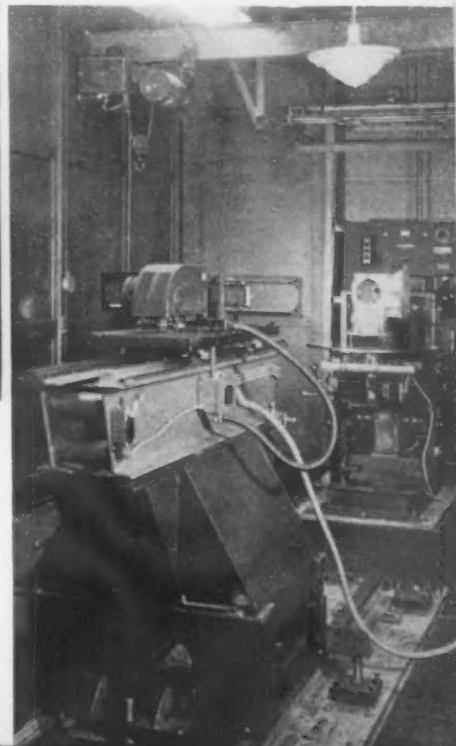


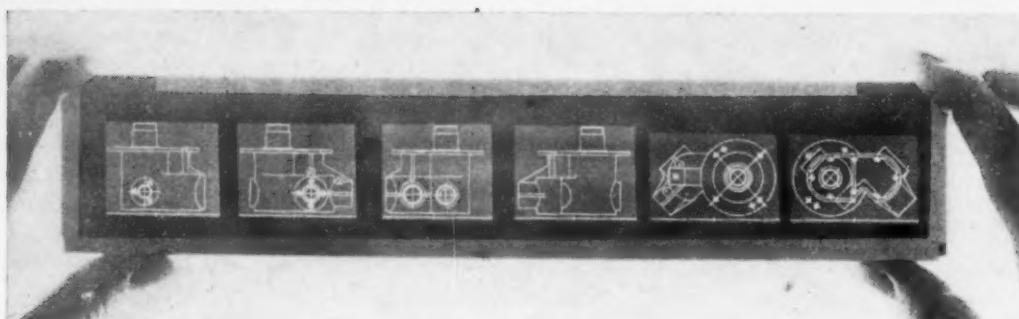
FIG. 3—Overhead optical wand and its carrier. The tilted mirror (arrow) picks up the ribbon of light from the auxiliary projector and directs it vertically downward to the inspection pedestal.

• • •

BELOW

FIG. 4—Plant installation of a photo-projection unit, showing the projector (in the foreground) the light wand, adjustable surface plate and control panel.





LEFT

FIG. 5—A finished slide. Note successive views with addition of a baseline which serves to orient the individual drawings to check the projection height.

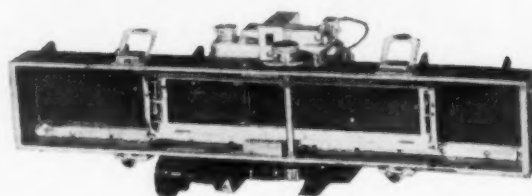
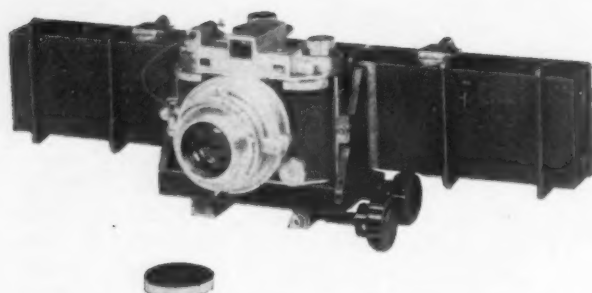


FIG. 6—Front and rear views of the camera used for preparing the inspection slides. The camera, with Ektar 100 mm f3.5 lens, is fitted with a special adapter back and slide carrier.

A carefully machined column and camera mounting arm, shown in fig. 7, was required to insure that the camera focal plane would remain accurately parallel to the easel surface. Any departure from parallelism would introduce a trapezoidal error in the resulting slide image.

Both the camera and the projector were built up using standard commercial items and making the necessary adaptations and additions. This saved valuable time and money and accomplished the desired accuracy without resort to special

optical equipment or unusually precise machining tolerances. There are certain details of the construction that are of importance, however, and which should prove of interest.

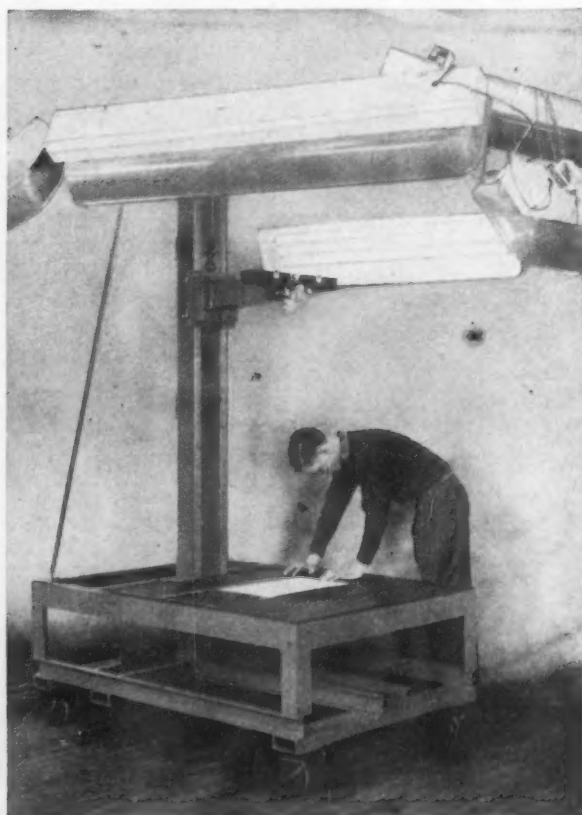
The need for accuracy in the camera setup cannot be over-emphasized. The slide carrier in the camera, and in the projector too, was carefully aligned so that the distance from the lens to the photographic plate or slide would not vary as the plate in its carrier was indexed from one position to the next through the total of six views. An error in one carrier without compensation in the other would yield a variable magnification of image at the inspection plane. Also each carrier (camera and projector) had to move the slide in a true straight line to maintain a fixed height of baseline. The need for controlling trapezoidal error in the camera was described above. It was equally important to control this error in the projector lineup as well. This was rather easily accomplished and checked from time to time by photographing an accurate layout of parallel grid lines and comparing these lines as projected on a large ground glass at the inspection plane.

The inspection projector is a massive structure mounted on steel rails, as shown in fig. 4, so that it may be moved to any one of the five projection distances, which vary from 5 to 20 ft from the inspection pedestal. A 10-in. focal length lens is used so that up to 25 magnifications are realized. At each of the five positions there are three adjustable steel pads on which the assembly rests when the wheels are retracted.

The projector proper is movable forward and back over ground steel ways to permit the adjustments for casting depth. A three point suspension on precision ball bearings insures that the projector remains level at all positions. Between the ways and beneath the projector is a motor and gear drive which is also geared to a selsyn generator whose electrical signal is transmitted forward to the optical (light beam) wand.

The wand projector and carriage is likewise

FIG. 7—Photographing drawings to make projection slides. Details of the camera are shown in fig. 6.



mounted on ground ways above the casting pedestal and along with the projector is free to move forward and back a distance of 3 ft, which accommodates the largest casting being inspected by this method.

The casting inspection pedestal, fig. 8, is a most important part of this equipment since the facility with which the castings can be positioned determines the ultimate value of the whole layout. Here again a motor drive is used to raise and lower the platform. The platform also has limited lateral movement and is rotatable with indexing stops at quadrant positions. At every possible position of the platform it is imperative that the top surface remain level. Only by this means can the baselines of each casting view be made to agree with the respective side of the casting as the platform carrying the casting is indexed around.

The ultimate accuracy and physical limitations of the equipment are questions that have arisen when new uses or this inspection method are contemplated. Obviously this method is of greatest value where quantities of material are large. The projection of a complete layout facilitates repetitive work and as in our case first consideration must be given to the production flow plan and the position of this inspection equipment laid out accordingly. In the present instance the inspection pedestal itself is arranged to be fed by electric fork trucks which bring in the castings on standard pads at one entrance and remove castings by another entrance at the opposite side. The larger the castings the more difficult they are to handle, and so there is usually a physical limit to the weight of casting that can be conveniently handled. With the present optical equipment there is also a limit on the practical size of casting. With a $1\frac{1}{2} \times 1\frac{1}{2}$ -in. slide image this plant is covering 36×36 in. adequately. If a more precise projection lens were used, this magnification could, however, be extended considerably. Also, if a larger slide image were used, a

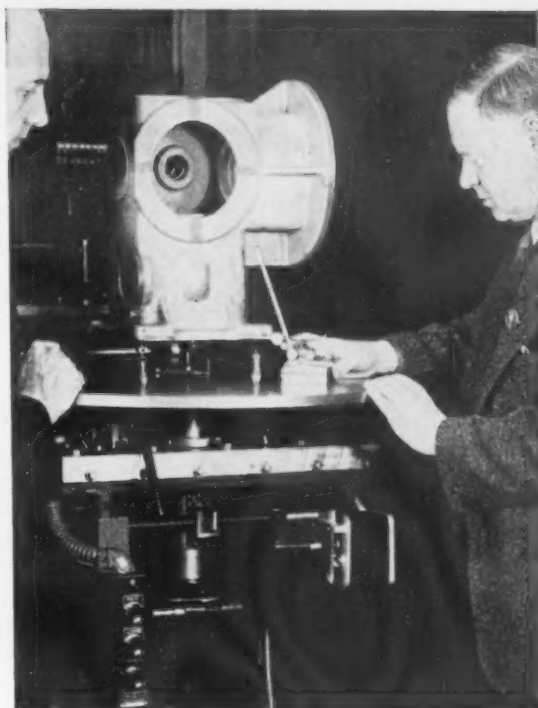


FIG. 8—The casting inspection pedestal. A motor drive is used to raise and lower the platform.

larger area could also be covered at the casting position.

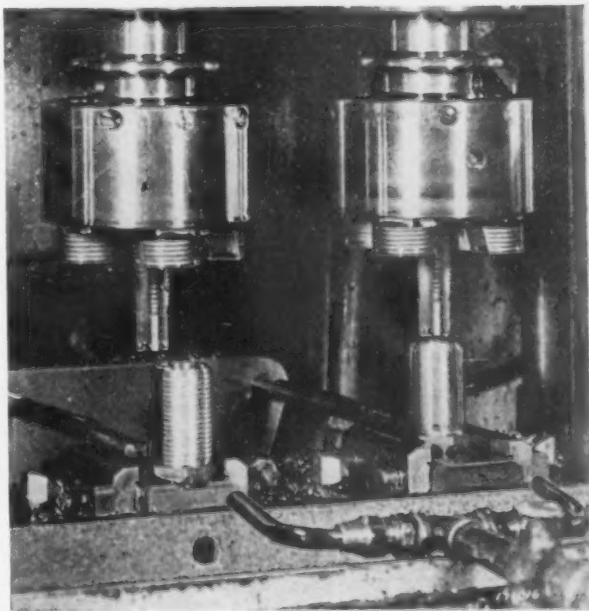
There are limitations in the accuracy of equipment and in the original drawings used. In the present installation a maximum error of 0.040 in. at the projection plane is set as the goal. This represents the accumulated errors of the drawings, the camera, the projector, and the inspection pedestal.

Accuracy is, of course, much easier to achieve at the lower magnifications and in fact the degree of accuracy can be improved considerably at all magnifications commensurate with the pains taken to achieve precision in each of the components that make up the inspection equipment.

Simultaneous Internal and External Threading of Bushings

SIMULTANEOUS internal and external threading of large steel bushings in an automotive parts plant on a 10-spindle Allen multiple drill press, permits the production of some 1100 threaded parts per hour for shock absorbers, knee action assemblies and other parts.

Internal threads are machined with a tap having a pilot to assure correct alignment, while the external threads are cut out with thread chasers which revolve with the spindle. This arrangement may be seen in the accompanying illustration which shows bushings before and after threading. The taps, manufactured by Detroit Tap & Tool Co., are held in the die heads by means of opposing lock screws. In operation, the bushings are slid into the fixture, hex end down. Thrust of the tap holds the parts down and torque is taken on the hex. The fixture is cleared of chips by an air jet in front of each fixture. Roll curtains are attached to each dual spindle head which travel up and down with the ram to protect the operator from oil spray.



Modern Developments in Precision Boring

IT is fundamental that all construction entering into a precision boring and turning machine must be of the maximum practicable rigidity.

Machine rigidity alone, however, is ineffective to hold deformation of the workpiece to a minimum, unless the cutting stresses are also held at the lowest practicable minimum, as by using a tool with the sharpest possible cutting edge and taking the smallest practicable chip, at least in the final cut.

The last stated requirement appears to be diametrically opposed to the rapidity of production which depends upon heavy stock removal, but it must be recalled that heavy stock removal is opposed both to the degree of dimensional accuracy and perfection of finish which are the principal objects of precision boring and turning. In spite of the small cuts, which must be taken to

Fast, extremely accurate, and capable of producing an extremely fine finish, precision boring is coming into a constantly widening field of application. Described herein are several practical examples of single and multiple boring operations on both large and small parts which serve to show the adaptability of the process and the savings in time that can be effected by its use.

maintain accuracy, precision boring or turning may be a surprisingly fast operation for the reason that the light cuts taken generate a negligible amount of heat, enabling unusually high peripheral cutting speeds to be utilized.

In a precision boring or turning operation frequently as little as 0.002 to 0.008 in. on a side is removed in the finishing cut. Unless

adequate precautions are taken in the control of prefinishing operations, it may be a practical impossibility to hold work with such a degree of accuracy that the required diameter will clean up when so minute an amount of stock is to be removed. This last problem vanishes in its entirety and a number of additional advantages are gained when the fixture in which the prefinishing cut is taken continues to hold the work while the finishing cut is made. Utilization of the last stated procedure is of the utmost importance in achieving that success in precision machining which includes minimization of cost as of comparative importance with mechanical excellence of the product.

The prefinishing and finishing operations, however, must be so planned that at no time will both be simultaneously in process, as stresses and vibrations set up by the prefinishing operation might be sufficient to interfere with the quality of the finishing operation. From a structural viewpoint, the machine itself is amply rigid to perform any reasonable prefinishing operation and will not be injured in the least by this.

Performing the prefinishing and finishing operation in a single machine and in the same fixture automatically accomplishes the following main economies: (1) Investment in machinery is lessened as one machine does both jobs. (2) Machine attendance cost is reduced. Frequently one operator can attend two machines without difficulty as one loading and unloading suffices for two operations. (3) Scrap from failure to clean up in the finishing operation is eliminated.

Considering now one of the simplest jobs, such as prefinishing and finish boring the sleeve bearing in an electric motor end bell, it will be seen that the work may be held on a work table for reciprocation between two opposed coaxial boring spindles, each supported on bridges which span the opposite ends of the table. One of these spindles gives rotation to a prefinishing tool which

TABLE I

Speeds and Feeds Recommended for Boring, Turning and Facing With Carbide Tools

Nonferrous

Operation	Finish	Semifinish	Rough
Feed per rev.	0.001-0.005	0.005-0.010	0.010-0.020
Depth of cut.	0.005-0.010	0.010-0.020	0.020-0.060

Surface Speed—feet per minute

	Aver	Max	Aver	Max	Aver	Max
Brass—hard	600	1000	400	800	300	500
Brass—soft	1000	2500	800	1800	600	1200
Bronze—hard	600	1000	400	800	300	500
Bronze—soft	1000	2500	800	1800	600	1200
Alum.—cast	1000	5000	1000	3000	1000	3000
Alum.—alloy	1000	5000	1000	3000	1000	3000
Magnesium	600	2000	800	1500	600	1200
Zinc—alloy	1000	5000	1000	3000	1000	3000
Copper	1000	2000	1000	1500	600	1200
Rubber—hard	1000	2500	800	1800	600	1200
Plastics	1000	2500	800	1800	600	1200
Bakelite	1000	2500	800	1800	600	1200
Fiber	1000	2500	800	1800	600	1200

Note: This chart is recommended under the following conditions:

Average: These figures may be used safely with proper tools and rigidly supported work.

Maximum: These figures may be approached or even exceeded if the tools and work can be supported with sufficient rigidity. For example, quills that are short in relation to their diameters support the tools rigidly, and workpieces with comparatively heavy wall sections can be clamped rigidly without danger of distortion.

in Precision Boring Practice . . .

engages the work when the table is moved to one side of its central position, and the other rotates the precision or finish boring tool which engages the prefinished sleeve after the movement of the table has withdrawn the work from association with the prefinishing tool and the work is moved to the other side of its central position. Upon completion of the finish boring operation the table returns to its central position wherein the work is spaced from both boring spindles and may be removed from the fixture in preparation for the performance of a like cycle of operations on the next succeeding workpiece.

The question naturally arises as to the essential difference between one of these automatic cycling machines which may perform a series of manufacturing operations completing a given workpiece, and a turret lathe or perhaps some of the simpler setups in an automatic screw machine. The answers are these: The precision boring and turning machine usually operates at much higher speeds, the finishing cuts at least, are lighter, and the work is produced to a higher degree of excellence as to dimensional accuracy, concentricity of diameters and perfection of finish.

Methods of Application

The principle of prefinishing and precision boring pieces in a single fixture loading may usually be applied in one of the three following ways:

(1) Reference has already been made to the prefinishing and precision boring of a sleeve bearing using opposed spindles. Such a setup is possible only when the hole is a straight through bore so that a tool may enter from either end. Though this procedure is advantageously used in relatively long holes, such as the pin boss holes in motor pistons, the procedure next to be described is more economical when a straight through hole is sufficiently short to permit its use.

(2) When the unsupported projection of the boring spindle can be somewhat greater than twice the length of the hole to be bored, the prefinishing tool may be located adjacent to the extreme end of the projection and the precision boring tool can be located in the same projection, spaced from the prefinishing tool by an axial distance which is slightly more than the length of the hole to be bored. The prefinishing tool, which always takes the heavier cut of the two, thus is clear of the bore before the precision boring tool enters the hole. The precision boring tool works under the more favorable conditions of the two as it has the shorter and more rigid projection. Usually the limiting condition arises from the inability of the prefinishing tool to cut without chat-

By **CARROLL R. ALDEN**
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Detroit

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ter due to its double length projection.

When sequential action of a prefinishing and a finishing tool rotated by a single spindle can be used, the maximum productivity of the machine can be realized, as the spindles on one end of the machine can be working while the operator is unloading finished work and replacing unfinished pieces in the table-reciprocated work fixture so that the machine continues successive cycles without interruption.

(3) Neither of the previously described procedures is applicable when boring a blind hole. In such cases a prefinishing spindle may be located alongside and parallel to the precision boring spindle with both tools facing the work fixture. This may most conveniently be supported on a cross slide having movement at right angles to the line of movement of the machine table. Preferably the cross slide is hydraulically reciprocated and tied in with the machine hydraulic system so that its movements are coordinated with those of the machine table. In one extremity of cross slide movement the work, upon reciprocation of the machine table, is presented to the prefinishing spindle. After retraction of the machine table following prefinishing, the cross slide

TABLE II

Speeds and Feeds Recommended for Boring, Turning and Facing With Carbide Tools

Cast Iron

Operation	Finish	Semifinish	Rough
Feed per rev.	0.002-0.005	0.005-0.010	0.010-0.015
Depth of cut	0.005-0.010	0.010-0.020	0.020-0.060

Surface Speed—feet per minute

	Aver	Max	Aver	Max	Aver	Max
Hard gray	400	600	300	500	250	400
Medium gray	400	600	300	500	250	400
Soft gray	400	600	300	500	250	400
Hard alloy	400	600	300	500	250	400
Medium alloy	400	600	300	500	250	400
Soft alloy	400	600	300	500	250	400
Semisteel up to 25 pct.	400	600	300	500	250	400
Semisteel over 25 pct.	400	600	300	500	250	400
Mall. hard	350	500	250	350	200	300
Mall. medium	400	500	300	400	250	350
Mall. soft	400	600	300	500	250	400

Note: This chart is recommended under the following conditions:

Average: These figures may be used safely with proper tools and rigidly supported work.

Maximum: These figures may be approached or even exceeded if the tools and work can be supported with sufficient rigidity. For example, quills that are short in relation to their diameters support the tools rigidly, and workpieces with comparatively heavy wall sections can be clamped rigidly without danger of distortion.

may automatically be moved to the other extremity of its travel where a second reciprocation of the machine table presents the work to the precision boring spindle. As the cross slide may be moved by hydraulic pressure and the slide may be stopped mechanically at each extremity, the forces involved may be exactly duplicated in succeeding cycles. The resulting linear indexing of the cross slide therefore is reproducible to a degree which is substantially perfect. Though this procedure requires two table reciprocations per fixture loading, the work cycle may be made fully automatic. In fact, if desired, such an arrangement may be made on a double end machine so that the loading and unloading of the work may be covered by the prefinishing and precision boring operations which may be proceeding on the opposite end of the machine.

When desired, it is possible to arrange the linearly indexing cross slide to be positively stopped at stations between its extremities of travel, as may be required for a roughing prefinishing and finishing sequence, or for facing, counter-boring, or such other operation as might require one or more additional stations.

Fig. 1 shows a special facing machine for simultaneously facing four forged steel valve cover plates, one of which is seen resting on the right end of the table. In operation one part is held in each of the four work chucks. Note that, in this special instance, the table carries the tools and moves transaxially to the spindles. The four manual chuck control levers are seen at the top of the photograph. This machine precision finishes 144 faces per hr at 70 pct efficiency, removing 0.005 in. of forged steel from pieces of 3.750 in. diam. The work is rotated at 1200 rpm. The feed is 0.002 ipr.

Boring Piston Pin Holes

Fig. 2 shows one of the simplest possible setups for boring the pin bosses in a motor piston by the first procedure previously described. The work holding fixture is mounted on the machine

FIG. 1—Special facing machine for valve cover plates in which four workpieces are held in chucks and the tools are mounted on a table which moves transaxially to the spindles.

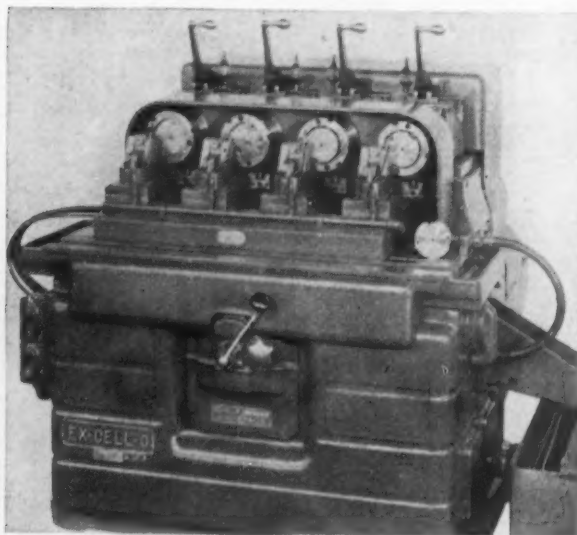
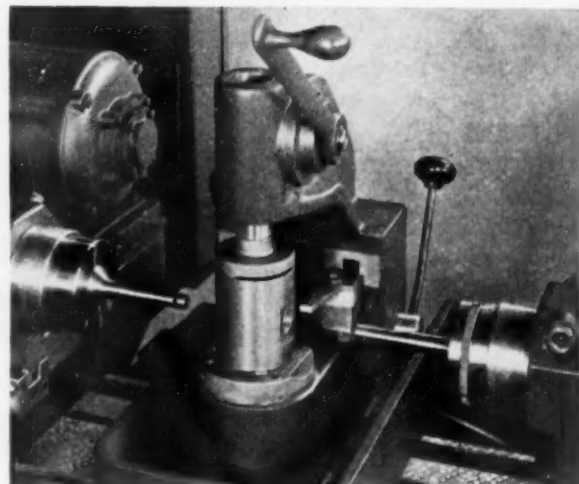


table which is shown in its central position with the prefinishing spindle to the right and the precision boring spindle to the left of the work.

On placing the piston in the fixture the crank handle at the top is released so that, by gravity, it lightly and frictionally holds the piston in the position which is given to it when the ball handled locating lever is pulled. Pulling this lever moves locator fingers, one at either end of the bore, to turn the piston so that the axis of the pin bosses is lined up with the axes of the coaxial boring spindles. When properly located, the crank locking handle is secured, the locating fingers are withdrawn and the cycle of machine operations is started.

These operations include a rapid approach movement of the table to the right until the prefinishing tool is about to engage the right boss, when an adjustable dog on the table causes the table to move at feeding speed. When the right boss has been prefinished, the table moves at rapid traverse, carrying the tool across the gap between the bosses, again reducing to feeding speed while boring the left boss. The prefinish-

FIG. 2—Simple setup for rough and finish boring piston pin holes where high production is not required. Prefinishing spindle, right, passes through both sides of the work and withdraws before the precision boring tool starts.



ing spindle then is stopped and the table moves toward the left at rapid traverse, past its center position. The precision boring tool then finishes both bosses in a cycle similar to that previously described, after which this spindle is stopped and the table returns at rapid traverse to its central or work loading position.

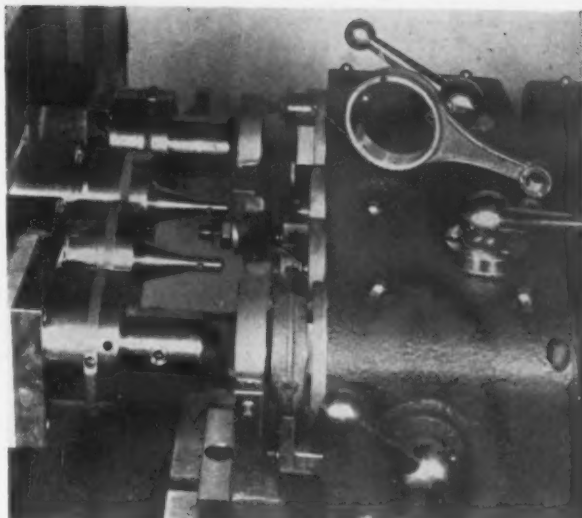
The actual boring time on such a job depends, of course, upon the material bored and the diameter and length of the bores to be prepared. Tables I, II, and III, respectively, are tabulations of the feeds, speeds and depth of cut recommended for working respectively in nonferrous metals, cast iron and steel with tungsten carbide tools.

Shown in fig. 3 is a setup generally similar to that of fig. 2 for simultaneously boring the piston pin bosses of three pistons.

By way of contrast fig. 3 shows a machine equipped with a fully automatic hydraulically actuated fixture coordinated with the hydraulic

system of the machine. The rear view is chosen because it shows an electric motor driven rotary valve for controlling the sequential operations of the fixture in locating the work, withdrawing the locating fingers, clamping the work and starting the machine cycle. Following completion of the machine cycle the fixture cycle is again resumed, unclamping the finished pistons and ejecting them from their locating sockets. The operator's sole duty then is to remove the finished pistons and replace unfinished ones within reach of the locating fingers, after which he depresses a start cycle button and both the fixture and the machine go through the cycles previously described. One operator may therefore attend two machines at a production per manhour of approximately six times that of the simpler fixture shown in fig. 2.

The prefinish and precision boring of four small connecting rods per machine cycle is shown



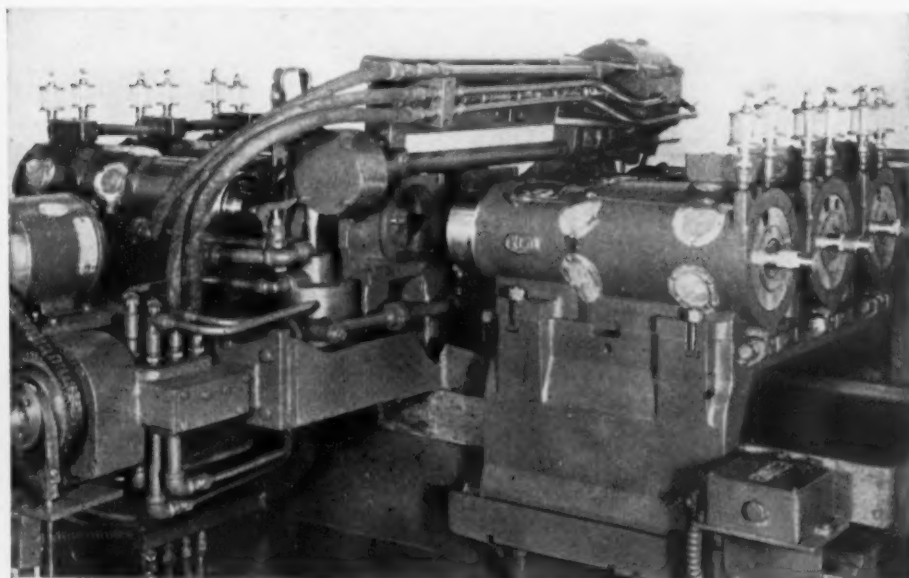
ABOVE

FIG. 4 — One end of a double acting machine for precision boring four small connecting rods. Center distance between large and small holes is constant, and two rods may be machined while two are being loaded. Production is 239 pieces per hr.

o o o

LEFT

FIG. 3—High production machine for simultaneous boring operations on three pistons. Fully automatic in operation, two of these machines can be handled by one man and will give six times the output of the simpler machine.

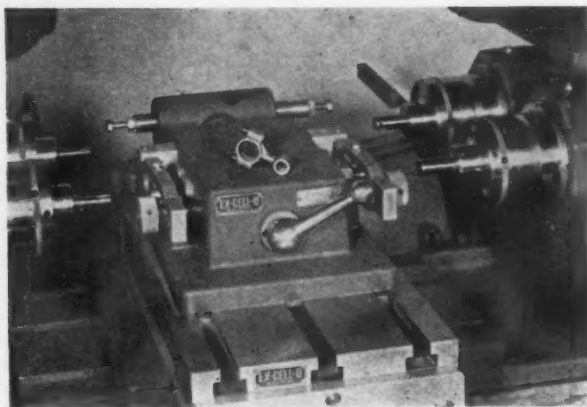


in fig. 4. The large end spindle nearest the reader clearly shows the adjusting screw for the precision boring tool. The prefinishing tool is located adjacent to the front end of the same boring projection.

It is to be noted that the center distance between the bores in the connecting rod is fixed by the axial center distance between the spindles of the several pairs. Also that perfect parallelism between the axes of the bores in the rod is positively insured as both bores are machined simultaneously upon traverse movement of the work holding fixtures which are mounted on the machine table. As there are four sets of work fixtures, four rods are prefinished and precision bored per cycle of machine movements, and two rods may be loaded and unloaded while two are being bored, so that the time of both machine and operator is efficiently utilized. A production of 165 rods per hr may be obtained at 100 pct efficiency if the boring tools are withdrawn at finishing feed to avoid tool drag-out line. If the spindles are stopped at the end of inward traverse of the tools and the work is withdrawn at rapid

traverse, disregarding an almost imperceptible dragout line, a production of 239 pieces per hr may be realized under otherwise similar conditions.

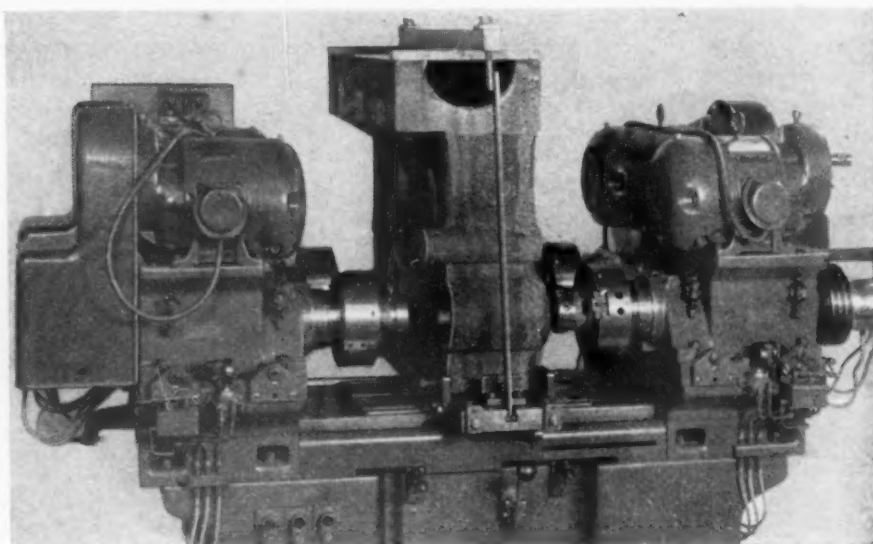
A setup for prefinishing and finishing the bores of an essentially similar connecting rod, in which the center distance between the rod bores is too close to permit a spindle spacing which will allow both ends of the rod to be bored simultaneously, is shown in fig. 5. This setup, therefore, requires the work holding fixture to be mounted on a linearly indexing cross slide, having its movements coordinated with those of the work table. When at one extremity of cross slide movement, a reciprocation of the table causes one of the bores of each rod to be prefinished and finished; a second reciprocation is required to prefinish and finish the remaining bores. In the present machine four table reciprocations, two to either side of center, are required to complete the boring of two rods, whereas, in the preceding machine, two table reciprocations, one to either side of center, will complete the boring of four rods, showing the advantage gained when the spacing of the rod



ABOVE
FIG. 5—Center distance between the holes on this connecting rod is too small to permit the use of the type of machine shown in fig. 4, and the work must be presented to the two spindles alternately.

□ □ □

RIGHT
FIG. 6—Size and weight of the workpiece is no obstacle to precision. The casting shown here weighs 1500 lb and two holes are bored and faced on each side to a tolerance of 0.001 in.



bores permits both bores in the rod to be processed simultaneously.

Boring Heavy Workpieces

The application of precision boring to an unusually heavy job is shown in fig. 6, and indicates that heavy work may be handled without damage to the machine or a sacrifice in accuracy in the work. The workpiece is an oil well pumping power housing weighing about 1500 lb and the job is the boring of two bearings, respectively, of 3½ and 6-in. diam and facing the ends of these, removing 3/16 in. from the end of each bore, all to a tolerance of 0.001 in. The roughing operation starts with cored holes 0.500 in. under the

TABLE III

Speeds and Feeds Recommended for Boring, Turning and Facing With Carbide Tools

Steel

Operation	Finish	Semifinish	Rough
Feed per rev.	0.002 0.005	0.005 0.010	0.010 0.015
Depth of cut	0.005 0.010	0.010 0.020	0.020 0.060

Surface Speed—feet per minute

	Aver	Max	Aver	Max	Aver	Max
SAE 1020-1030	600	1800	500	1500	400	800
SAE 1030-1095	500	800	400	600	275	350
SAE 1112-1120	600	1800	500	1500	400	800
SAE X1314-X1340	500	1200	350	800	275	500
SAE T1330-T1350	400	800	350	500	275	400
SAE 2015-2320	500	800	400	600	300	500
SAE 2330-2350	400	800	350	500	275	400
SAE 3115-3130	400	800	350	500	300	400
SAE 3135-3450	400	800	350	600	275	400
SAE 4130-4820	400	800	350	500	275	400
SAE 5120-52100	400	800	350	500	250	350
SAE 6115-6195	400	800	350	500	250	350
Stainless steel	500	1000	400	600	350	500
Cast steel	350	600	300	350	275	350

Note: This chart is recommended under the following conditions:

Average: These figures may be used safely with proper tools and rigidly supported work.

Maximum: These figures may be approached or even exceeded if the tools and work can be supported with sufficient rigidity. For example, quills that are short in relation to their diameters support the tools rigidly, and workpieces with comparatively heavy wall sections can be clamped rigidly without danger of distortion.

finished diameter. Due to core shift, the stock to be removed frequently is eccentrically disposed and the depth of cut may be as much as 0.375 in. on one side.

In the present instance hydraulically actuated facing heads, having a gibbed facing cutter cross slide, as clearly seen in the right hand forward spindle, are moved as a part of the cycle of the hydraulic power system of the machine.

Roughing tools bring all diameters to within 1/32 in. of finished sizes and faces to within 1/64 in. The sequential finishing tools must bring both diameters and the four faces to the final tolerance of 0.001 in.

The axial spacing of the spindles may be altered to suit the requirements of castings of different sizes and the spindle supporting bridges may be adjusted longitudinally along the base for the same purpose.

Using conventional machine shop tools and time-honored methods for laying out and setting up the job, the former production was one finished casting per operator per day. With the precision boring machine shown, the floor-to-floor time was reduced to 15 min. The only substantial change from an otherwise standard boring machine was the application of heavier-than-usual spindle driving motors and the use of suitably heavy boring heads.

Fig. 7 shows a special precision boring machine arranged for operation according to the third described procedure. The job to be done is the roughing and precision boring of various sizes of ferrous, tapered plug cock bodies, including the facing and counterboring of the stepped recess at the outer end of the bore. The inner end of the bore is blind. As the completed valves must be tight against air pressure or light liquids, such as gasoline or fuel oil, the quality of the bores, as to dimensional accuracy and perfection of finish, must be the highest obtainable. The valve bodies are hydraulically clamped in chucks which are rotated by work spindles mounted on the hydraulically reciprocated work table of the machine. The center line of the spindles makes an angle with the line of traverse of the table which is half of the total included angle of the tapered valve bore. The chucks are provided with interchangeable jaws for holding valve bodies of different sizes, and provision is made for holding the valve plugs for turning on the same machine, so that their taper may exactly match that of the bodies.

On a cross slide gibbed to the island within the coolant pan formed on the top of the machine base is a pair of almost identical roughing and finishing tools for each work spindle. Alternatively, the roughing or the finishing tools may be indexed into working association with the spindles by movement of the cross slide which takes place on a line at right angles to the axis of rotation of the spindles. Each boring tool is mounted on a separate short stroke slide for limited traverse on a line parallel to the axis of work rotation. At the base of each boring tool are fixed two additional cutters (not visible in the photograph). One of these forms the counterbore at the entry to the tapered bore and the other faces the larger annulus at the end of the tapered bore. The elements of the cylindrical counterbore, therefore, are parallel to the axis of the tapered bore and the faces are at right angles thereto.

The tool carrying cross slide has two principal transverse positions, one for roughing the tapered bore and the other for finishing. A secondary or entry position, however, is spaced about $\frac{1}{4}$ in. of cross slide travel from each of the boring positions.

At the start of the cycle the cross slide stands in the position to allow the rough boring tools to enter the cored tapered hole in the body, out of contact with the work, upon movement of the table to its forwardmost position. The individual tool slides then move forward plunging the counterboring tool into the work to the desired distance. The main tool cross slide next moves to

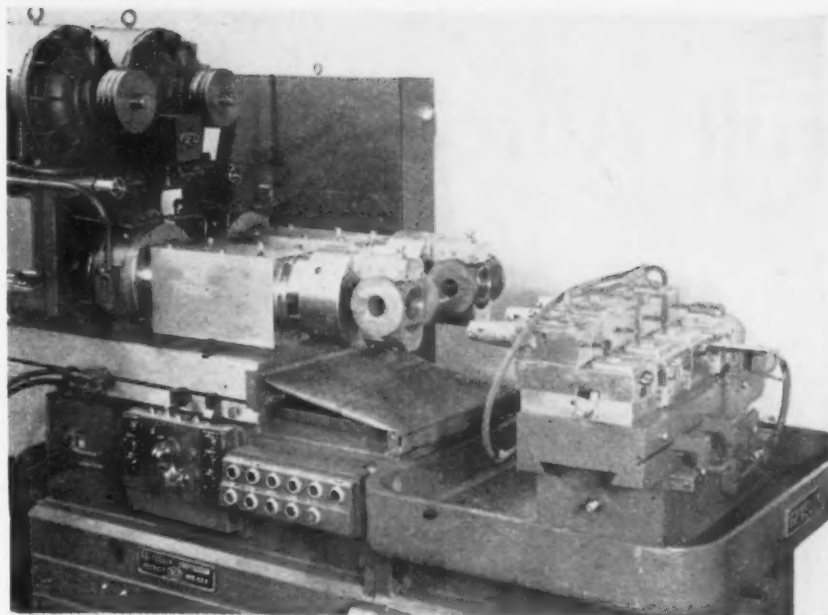


FIG. 7—Special arrangement for precision boring taper holes in plug cock bodies. Centerline of the work holding spindles is set at an angle to the line of traverse of the table to produce the taper, and production is 21 pieces per hr.

o o o

cause the counterboring tool and the outer facing tool to move across the respective faces of the stepped counterbore. This movement brings the points of the principal boring tools into a relation where they revolve in the clear at the bottom of a slight counterbore cast in the inward end of the tapered bore. A feeding retractive movement of the machine table then causes these tools to generate the tapered bore on the out stroke of the table.

At the end of the roughing cut all roughing cutters are clear of the work and the tool supporting cross slide indexes the finishing tools into every position, while the individual tool slides retract in preparation for a second identical cycle of tool movements, this time with the finishing tools in association with the work.

With this machine, valve bodies may be produced at the rate of two pieces floor to floor every 4.6 min or 21 pieces per hr at 80 pct operator efficiency for valves of $2\frac{1}{2}$ in. nominal pipe size.

All movements of the work chucks, including stopping and starting of the spindles, and all longitudinal movements of the work table and the tool supporting cross slide are organized into a sequential cycle under the unified control of a start cycle and an emergency stop button, though the various functions are individually controllable by separate buttons during setting up. Tungsten carbide tipped tools are used for both the pre-finishing and finishing operations. Due to the fact that the cuts in both the boring and turning operations are interrupted by the rectangular cross-section of the ports extending therethrough, and the further fact that roughing cuts are very heavy and the finishing cuts must leave the work in the highest possible state of excellence, no pains have been spared to make the machine construction as rigid as engineering skill and ample use of metal can make it.

Full Automatic Hot Zinc Galvanizing Of Tanks

One of the major developments of recent years in hot zinc galvanizing — the conveyerizing of operations — is discussed in this article. The author explains the advantages of full automatic methods, describes several interesting examples of conveyerized tank galvanizing installations and comments on makeup and other characteristics of baths for mechanized operations.

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THE simplicity of the operation of hot zinc galvanizing of metal parts has to some extent been responsible for the hesitancy of operators to work out new techniques and materials, as well as developments with the equipment itself. In view of this the progress made in hot zinc galvanizing, insofar as new developments are concerned, has not kept pace with developments made in the other phases of metal finishing. Fortunately there have been some developments, and these have aided materially in producing coatings with improved physical characteristics as well as a reduction in the overall cost of processing.

The basic equipment in the galvanizing department has undergone very little change. The major step has been one of conveyerizing the operation for the purpose of either obtaining lower labor cost, greater production, or better uniformity of product. The economic aspects of conveyers as they are and may be applied to hot zinc galvanizing, are in many respects the same as when they are employed in other fields of industrial activity. There is the same advantage of better utilization of manpower. Production is very often increased, since conveyers will usually transfer more material in a given length of time than could be done otherwise. Uniformity of product is a result of maintaining constant time in each step of the treatment cycle. Another advantage is the elimination of exposing the worker to the hazards of working in close contact with corrosive acids and molten zinc. These things being true, it is plain that mechanization of process is worthy of consideration.

Semiautomatic and full automatic conveyer systems have been used in galvanizing woven wire products, sheet, strip and pipe. While it is true that a number of conveyers in operation in hot zinc galvanizing departments are very few, those that are in operation have more than proved their worth. While many classes of product are not adaptable to full automatic production, most products are adaptable to semiautomatic processing. For example, in addition to applications mentioned above there are at present several semiautomatic installations in the refrigerator industry for the processing of evaporators. In one plant the pickling, rinsing and fluxing is done on a conveyer. The parts are removed from this conveyer at the kettle, where

they are immersed by hand in the molten zinc. After removal from the zinc these parts are placed on another conveyer, by which they are carried through a quenching operation and, subsequently, inspection and trimming. There are similar installations in other fields of industrial activity.

Fortunately, the treatment cycle is basically the same for the various types of product and in most cases these operations could be carried out with a conveyer of one type or another. A suitable cycle applicable to most classes of work is as follows:

(1) *Clean*. Solvent type degreasers can be used; however, the nature of the work being processed and the condition of the base metal does not usually make this type of cleaning attractive. The most widely used cleaners are usually proprietary alkaline compounds which are operated at temperatures of from 1800°F to boiling. The concentration of the cleaners used varies, depending upon the alkaline compound. However, in most cases it is usually found that concentrations vary from 6 and 12 oz per gal.

(2) *Hot Water Rinse*. The most satisfactory rinse is usually obtained by immersing the article in clear hot water. A proper rinse tank should be supplied with an overflow and a means of supplying fresh water continuously to the tank. Agitation is also extremely helpful in securing good rinsing. The purpose of this step is to remove alkaline material which has been carried over from the cleaner.

(3) *Acid Pickle*. In many plants the work being processed is relatively free from heavy dirt and the first two operations are eliminated, in which case the acid pickle would then be the first operation. General pickling practice is to use sulfuric acid from 5 to 10 pct by volume in strength, and to continue additions of new acid to the tank until the iron content of the pickle reaches amounts exceeding 5 pct. Then the pickling acid is thrown away and a new solution is prepared. The recommended practice calls for the use of the weakest sulfuric acid practical and discarding this pickle more frequently, thus avoiding the high iron sulfate content and more difficult rinsing. The sulfuric acid pickle is operated at 140°F or higher. The purpose of the pickling operation is to remove scale, rust, etc., from the surface of the work being processed so that these occlusions will not prevent proper alloying of the iron with the zinc. Other acids are sometimes used and the selection of the proper acid, temperature, immersion time, etc.,

is determined by the operator to conform to the type of oxides to be removed, and sometimes by the type of steel being processed.

(4) *Water Rinse*. The work is transferred from the acid pickle to the freely running cold water rinse as quickly as possible, before the work has had an opportunity to dry. If the work dries in the air after leaving the hot pickle, it assumes first a greenish cast and eventually a brown color, as first a ferrous and finally a ferric basic sulfate film forms. Proper attention to this operation will result in lower dross production and smoother, more ductile and adherent coatings.

(5) *Flux Wash*. The preferred basic flux wash is a solution of zinc ammonium chloride in water.

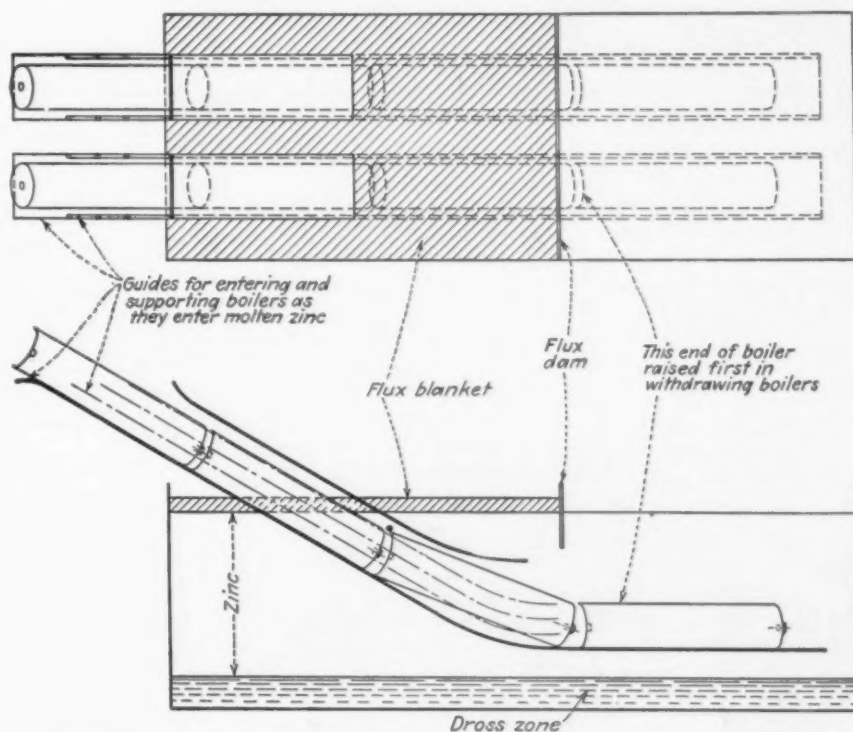
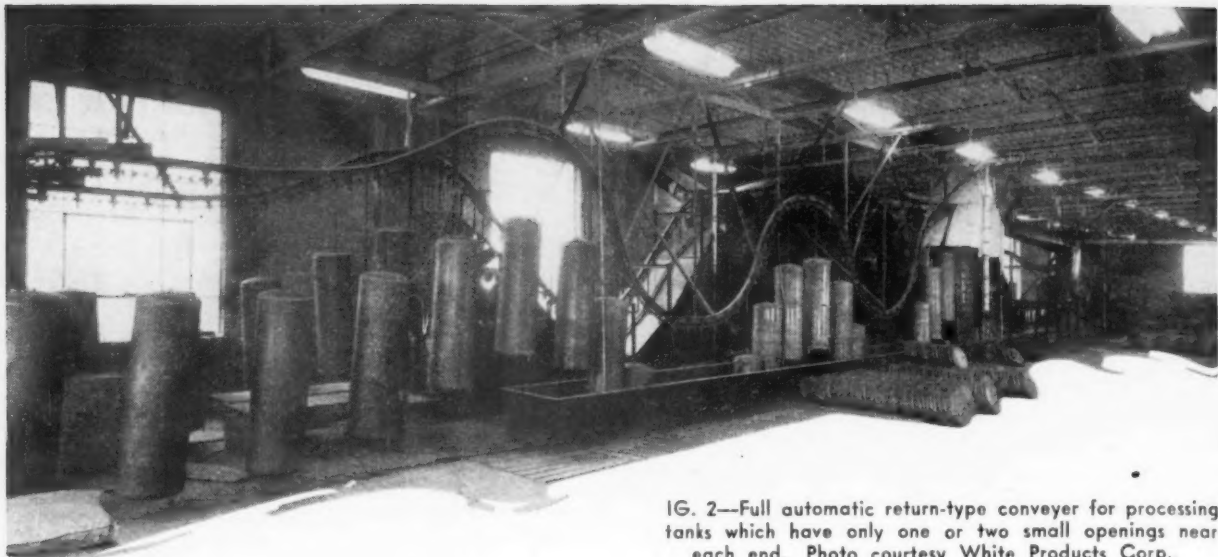


FIG. 1—Schematic layout of a chute arrangement being successfully used to galvanize cylindrical shaped tanks.

This procedure has led to the development and broad use of prepared fluxes which consist of mixtures of the proper zinc ammonium chloride with other materials which improve the wetting ability of the flux wash and yield foaming fusions on the zinc kettle. The oldest flux of this type is known as No. 20 flux. A temperature of 170°F is recommended to facilitate rapid dispersion of excess water in the flux film and to aid in producing a dense film of the flux on the work, which will prevent oxidation until such time as the work is processed in the zinc kettle. The advantage of this step is in keeping the steel clean and active, so that when it is immersed in the molten zinc, the flux film will quickly wash off, leaving a surface prepared for proper alloying of the steel with the zinc. The older practice of using hydrochloric acid as a flux wash has the disadvantage of carrying over with the work iron as ferrous chloride. This iron chloride is present in the form of a film on the surface of the work and must be removed in the molten zinc before the zinc will satisfactorily alloy with the iron.



IG. 2—Full automatic return-type conveyor for processing tanks which have only one or two small openings near each end. Photo courtesy White Products Corp., Middleville, Mich.

Removing the iron chloride in the kettle provides iron to form dross. Aside from the ferrous chloride formed on the work as it is held in the air before entering the zinc kettle, there is also the problem of ferrous chloride being present in the hydrochloric acid solution. Using the zinc ammonium chloride flux wash usually results in a material reduction in dross formation and a decided improvement in zinc coating adherence and ductility. Table I will serve as a guide in making zinc ammonium chloride flux washes. Typical flux washes at the following densities and temperatures are in constant use:

- 5-10° Be....175°F—for straight wire
- 10-15° Be....140°F—for woven wire fabrics
- 12-18° Be....175°F—for tanks, drums, etc.
- 15-20° Be....175°F—for castings
- 15-25° Be....120°F—for pipe
- 12-20° Be....Cold—for sheet ware

(6) *Zinc Kettle.* After the flux wash the work is immersed in the molten zinc. Usually a portion of the surface of the zinc kettle is covered with a flux blanket. The blanket is a frothy fusion of zinc ammonium chloride usually containing a frothing agent, which acts as an insulator in retarding the destructive effect of the temperature of the zinc and also aids in maintaining a frothy fusion, which has the function

of preheating as well as cleaning since the work is immersed through the blanket down into the zinc. The work is then withdrawn on the clean or bare side of the kettle. Aside from the advantages of the flux blanket, there is also a material benefit to be realized in reducing at least a portion of the surface of the zinc exposed to the air, which in turn helps to reduce loss from ash formation.

A suitable conveyor could be designed to carry most any product through this series of treatments. However, with many products it would be necessary to process through the kettle by hand, following the process made necessary by the size and shape of the product.

Since the end of the war there have been several full automatics designed and put into operation for the galvanizing of steel tanks of one size or another. This is a particularly interesting application inasmuch as it had been felt by some of the leading manufacturers that this would be an extremely difficult product to process on a full automatic conveyor. There are today usually three methods of processing these tanks and the method used is dictated by the design of the tank being processed. There is one design in which the center portion, or the body, of the tank and the two ends are each processed separately. There is another design in which the body of the tank has one end welded on prior to processing and the other end is processed separately and welded on after galvanizing. The third type, which is the most difficult to process, is a tank designed so that the body and two ends are welded together prior to galvanizing.

The great majority of tanks have been conveyed through the cleaning, pickling, rinsing and fluxing states of the treatment cycle with a hoist, either one at a time or in groups of half a dozen placed in a fixture designed for this purpose. The method of introducing the tanks to the kettle and the removal of these tanks from the kettle after coating was handled in several ways. A diagram of a chute successfully used by many galvanizers of cylindrical shaped tanks is shown in fig. 1. The chute is constructed of low carbon

TABLE I

Zinc Ammonium Chloride Density
Data at 68°F

G Salt per 100 cc Water	° Be	Lb of Salt in 1 Gal Solution
10	7.45	0.79
20	11.8	1.51
30	15.5	2.16
40	18.7	2.73
50	21.4	3.26
60	23.6	3.73
70	25.9	4.18
80	27.8	4.57
90	29.6	4.96
100	31.0	5.31

1° F change in temperature affects the Baume reading about 0.029° Be.

angle iron of similar composition to the kettle and is constructed to fit the individual kettle. The tanks are placed on the chute one at a time and allowed to sink through the flux blanket. This flux blanket is usually 4 to 8 in. high and is held in place by a flux box and a dam of suitable dimensions.

As the first tank becomes partially submerged, a second tank is placed in the chute. The tank is allowed to sink into the molten zinc and is guided by the chute under the dam and then withdrawn on the opposite side in a continuous process. The average production with a setup of this type is in the neighborhood of 35 to 40 tanks per hr, of the 30-gal size, and this production is usually accomplished with a total of six men in this department.

Another method sometimes used is one in which the tank is introduced in the kettle by means of a hoist. In this setup the tanks remain in a vertical position through the flux box and into the zinc. After 15 or 20 sec they are transferred to the open side of the kettle through a small gate in the dam. After skimming the surface to remove the ash, the tank is withdrawn. Tanks with one or two open ends are more easily submerged and can be processed more readily in a vertical position. The tanks with closed ends are not as rapidly submerged and are usually processed with the chute.

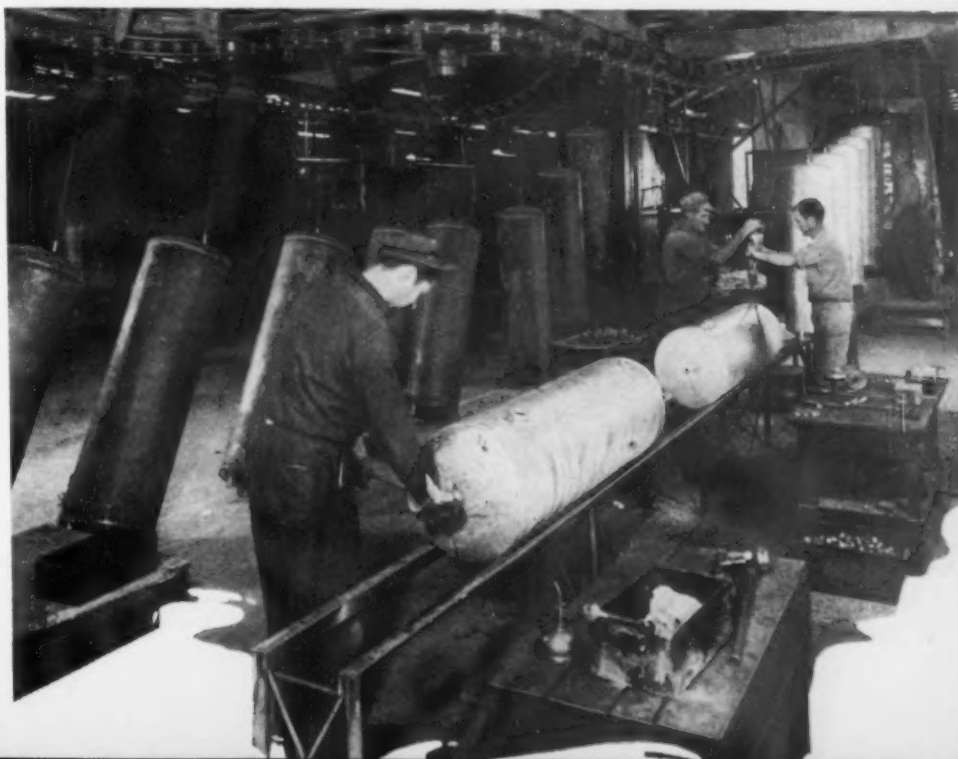
The latest development in galvanizing tanks is to process these tanks on a conveyer, which carries the work through all of the steps in the cycle and thereby eliminates handling except at the loading and unloading station. These tank conveyers are all of the continuous chain type. The hooks or work carrying members on the conveyer are suspended from trolleys running on a steel rail, which can negotiate turns to either right or left and in addition, can be routed either up or down. These trolleys are always evenly spaced and can be traversed with the chain by power. Nearly any kind of hook or rack can be adopted for carrying on these conveyer trolleys. The fixtures for carrying tanks are extremely simple, usually being nothing more than a rod with a hook on one end for making contact with the tank, and the other end fastened to the trolley. Of the few full automatic conveyers in operation for galvanizing tanks there appears to be only one major difference in their operation, and that is in the manner in which the tanks are submerged, which in turn is dependent on which of the three types of tanks are being processed.

A full automatic return-type conveyer for processing tanks, which have only one or two small openings near each end, is shown in fig. 2. Before placing the tanks on the conveyer the tapped holes are protected from the zinc by stopping off with a proper

size bolt screwed into the holes. These bolts are removed from the tanks before the zinc coating has had time to freeze. The loading and unloading station of this conveyer is pictured in fig. 3. On the left side can be seen tanks beginning the treatment cycle and on the right of the conveyer the finished tanks are returning. The man at the extreme rear of the photo is removing bolts from the tapped holes and the two men in the center of the photo are running a chaser over the threads to remove the buildup of zinc from the lip of the openings. It should be noted that a small bracket has been welded onto one end of each tank, to which is fastened the hook which conveys the tanks through the treatment cycle. Considerable thought was expended in determining the proper placement of this bracket. After much trial and adjustment the present location on the head was found to give the most satisfactory results. The leading end of the tank, that is, that portion which enters the solution first, is closed with the exception of a small opening of $1\frac{1}{2}$ in. diam. The tank enters the solution in such a manner that the liquids are allowed to flow inside of the tank through the small hole, which is necessary in order to submerge the tank. If the solution does not flow into the inside of the tank quickly, the tank will float on the solution rather than sink. When one considers that these tanks are moving forward at a chain speed of 5 fpm, spaced 2 ft apart, the effectiveness of the method used in submerging these tanks without interference with other tanks on the conveyer can be visualized. The liquids are also drained from the inside of the tank through the same opening.

Also worthy of note is the construction of the zinc kettle which is a part of this conveyer. This kettle has been constructed of a refractory material and the temperature is maintained with electric immersion heaters. From the flux wash solution the tanks are carried through a heated oven, through the zinc, and out through a heated oven. The oven and the zinc tank are covered with an insulated hood, which aids considerably

FIG. 3—Loading and unloading station of the full automatic galvanizing line shown in fig. 2.



in improving the efficiency of the kettle and also prevents the zinc from freezing until the operator has had a chance to remove the stop-off material from those sections of the tank which are not to be covered. At this particular plant the tanks are clean, so that the first operation is an acid pickle, followed by the treatment cycle mentioned earlier.

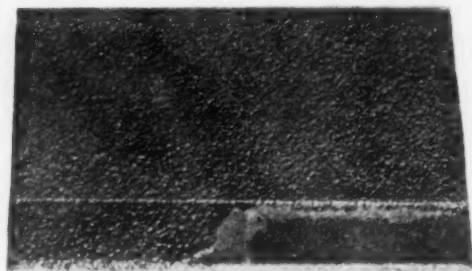
While there are many thousands of tanks of one sort or another galvanized every day, the number of semiautomatic or full automatic conveyers for processing them can be counted on the fingers of one hand. From the results obtained thus far, it appears that where production warrants it, the consideration of a full automatic conveyer for processing tanks is justified.

Test Shot Blasting for Sealing Sprayed Lead Coatings

USE of lead in metallizing for industrial applications, such as lining equipment exposed to sulfurous gases and sulfuric acid, has been limited due to the permeability of sprayed metal deposits. In an effort to develop a method of sealing the pores of sprayed lead coatings, shot blasting with round steel shot was recently tested and showed promising results. Tests were conducted by Metallizing Engineering Co., Inc., Long Island City, N. Y. Previous work with sprayed lead coatings indicated that none of the existing lacquers, resins, waxes, varnishes or other impregnating materials could be expected to form an effective seal, except for limited service. It was found that shot blasting, if carried to excess, distorted and spread the sprayed coating and caused the bond to fail, particularly in work done under adverse conditions, where the original surface preparation is not perfect, and where sharp corners and irregular shapes result in localized stress concentrations. For this reason the test was divided into two parts to determine whether a practical method of bonding could be provided which would safely withstand the stresses set up by shot blasting the coating and to check permeability of shot blasted coatings under unusually severe conditions.

In the bonding test, three panels, 2x3x $\frac{1}{8}$ in., were blasted in a suction feed machine at 75 psi air pressure with Metcolite F, and half of each panel was then masked off and the other half sprayed with 0.002 to 0.003 in. of Metcoloy No. 1, Spraysteel 10 and Metcoloy No. 2 respectively, to provide the bond. The masking was removed and all three panels were coated with 0.03 in. of sprayed lead with standard pressures. The panels were then blasted over the entire surface for 15 sec with No. 16 round steel shot at a pressure of 100 psi held 8 in. from the blast nozzle. No bond failure was evident. The panels were again masked off, leaving a $\frac{1}{2}$ -in. wide strip running lengthwise along one edge exposed, and the blast was concentrated on this area. Half of this area had a sprayed hard metal undercoat and half had no undercoat. Failure of the bond for the two areas of each panel was as follows:

	Failure Time (in sec)	
	Undercoat—No Undercoat	
Metcoloy No. 1.....	48	8
Spraysteel 10	30	5
Metcoloy No. 2.....	35	4

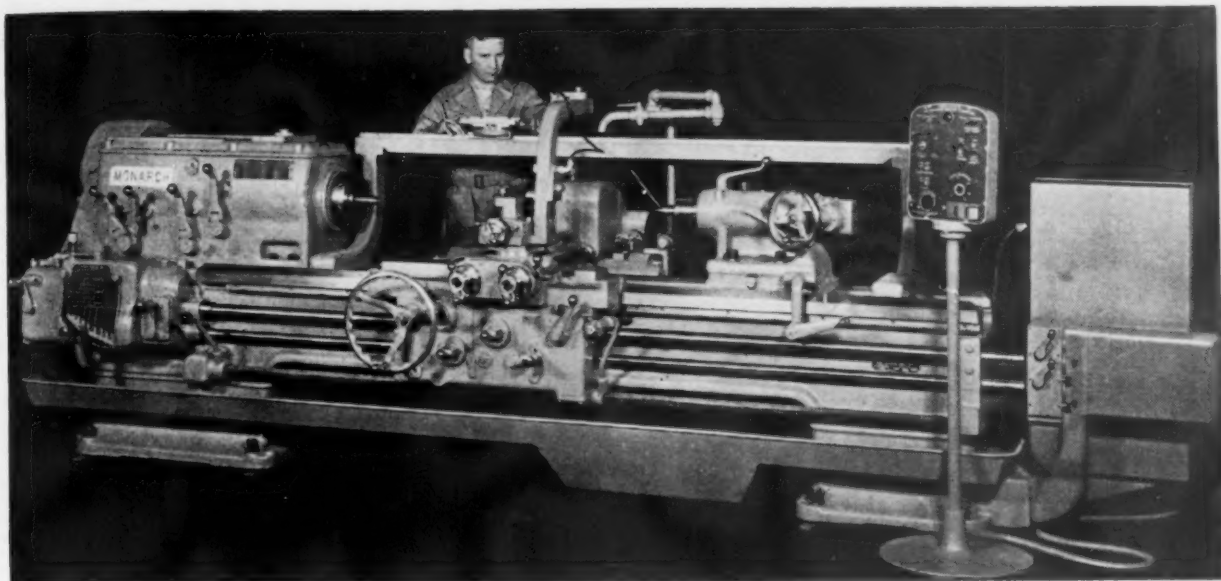


The accompanying illustration shows one of the panels at the completion of the test. The area at the lower right hand side failed after 8 sec and failure started on the left half after 48 sec.

To test the permeability of shot-blasted coatings, two cylindrical bars 1x6 in. were prepared by blasting with Metcolite F and each bar was coated with 0.002 in. Metcoloy No. 1, plus 0.03 in. of lead. The first bar was shot blasted for 12 sec and the second was left as sprayed. The bars were immersed in a 40 pct solution of sulfuric acid for a period of 6 days, during which time the solution was held at the boiling point for a total of 30 hr. The bars were removed and the coatings machined off. No discoloration or penetration was noted on the shot-blasted bar, but the base of the other bar was blackened and the coating had begun to loosen.

Another phase of this test consisted of applying a coarse lead spray coating of 0.035 in. to a porous core which was then shot-blasted for half its length with No. 20 shot at 75 lb in a suction feed machine, and tested underwater with 100 psi air pressure. Bubbles formed almost immediately on the unblasted section, but none showed on the blasted part which was then machined down progressively to a thickness of 0.01 in., at which point a few bubbles appeared after $\frac{1}{2}$ -hr immersion under pressure. This would indicate the blast closed the pores to a depth of approximately 0.025 in.

Engineers of the Metallizing Engineering Co. feel, on the basis of these tests, that a light undercoat of any of the three metals used would provide an ample safety factor, and permit shot blasting of sprayed lead coatings with no danger of destroying the bond. The initial 15 sec blast, which resulted in no failure at any point, effectively closed the pores. The heavy shot and high pressure provide an additional safety factor; No. 20 shot, used with 60 to 75 psi in a suction feed machine, or 35 to 50 psi in a force feed machine, should be sufficient. It should be noted, however, that sharp corners and irregular shapes require a large safety factor.



ATACHED to a standard 14-in. or larger toolroom or engine lathe, this automatic sizing device converts it to an automatic lathe without interfering with normal operation.

Automatic Sizing Unit

A COMPLETELY new automatic sizing unit has been developed by means of which a standard engine or toolmaker's lathe can be converted from manual to automatic operation for such work as step shaft turning, boring, and contour turning, or any combination of these operations. Developed by Monarch Machine Tool Co., Sidney, Ohio, the automatic sizing equipment will be available on all the company's 14-in. and larger engine and toolmaker's lathes. The addition of the sizing controls in no way interferes with the normal functioning of the lathe nor are any of the features of the standard machine eliminated.

Conversion from manual to automatic operation is said to take about 1 min. Setup time varies from 5 to 15 min, making it economical to use the automatic sizing equipment for even very small quantities of parts. In tests which have been made with the new equipment, production has been increased by two to one. The quick setup time with maximum production cycle is reported to make it, for most applications, equally as fast as an automatic lathe.

Distinctly new in conception, the automatic sizing unit takes full advantage of recent developments in electronic control equipment. Since automatic sizing makes the lathe an automatic machine, after the setup, the operator merely loads and unloads. In most cases he handles two

or more machines with no more effort than is required in the handling of one manually operated lathe. As size control is dependent upon the machine, not the operator, there is perfect duplication of size from piece to piece but at no sacrifice in the speed inherent in the automatic sizing control.

Time is saved to an extent not heretofore possible due to the fact that on shoulders the tool rapid traverses out at 100 ipm to a stop to within any predetermined distance from the OD of the next diameter. Feed for this diameter starts automatically at the predetermined feed rate. A minimum of time is required for the tool to move out into position for the next largest diameter. Operation is so sensitive that the machine will respond to a diameter change of as little as 0.001 in. At the end of the cut the tool backs away from the work, immediately following which the carriage rapid traverses back to its starting position at the rate of 100 ipm.

Size control is by means of diameter gage blocks, micrometer gage blocks or a template. They are mounted on a rail to the rear of and above the work center line. Consequently, all setups may be made by the operator from the front of the machine. Diameter gage blocks are ordinarily preferred for work which will be repeated from time to time. Otherwise the micrometer gage blocks are recommended for most

step shaft jobs. A template is employed by some users for step shaft work which is frequently repeated. If tapers or contours are to be formed, a template is required.

The compact automatic sizing controls are mounted on the right hand end of the machine, as shown in the accompanying illustration. Separate feed motors supply power for the length

feed and the cross feed. Both of these motors are electronically controlled, with the result that there is constant feed regardless of load variations. This feature is largely responsible for the high degree of accuracy and finish maintained over the entire length of the work piece. Both the length feed range and the cross feed range are $\frac{1}{2}$ to 20 ipm.

German Wartime Technical Developments

REPORTS of German practice in numerous technical fields of interest to engineers and executives in the metalworking field, issued recently by the Office of Technical Services, Washington, are briefly described below. These reports are in addition to detailed articles of certain phases of German practice previously published in THE IRON AGE. Copies of the reports listed below may be obtained in either photostat or microfilm

form, as indicated. Orders for copies of these Reports should be addressed to Office of Technical Services, Department of Commerce, Washington 25, D. C., giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, Aug. 29, p. 39, Sept. 26, p. 80, Oct. 10, p. 67, Nov. 14, 1946, p. 81, Jan. 9, 1947, p. 64, Jan. 16, p. 53, Mar. 6, p. 70, Apr. 17, p. 57, and July 3, p. 66, for a list of earlier reports.

Converter Practice—The 50-ton converters built in Germany during the war may be the most economical way to make large quantities of good basic Bessemer steel, according to a British report on German metallurgy. By using a shallow converter bath, German experts claimed they could appreciably reduce the nitrogen content of the steel. Sheets for electrical transformers with a guaranteed energy loss of 0.9 w per kg were produced. Metallurgy Plants: PB-60387; photostat \$9.00; microfilm \$3.00; 121 p. Electrical Steels: PB-65673; photostat \$7.00; microfilm \$3.00; 105 p.

High Temperature Steel—German steels for high temperature uses are evaluated in terms of United States standards in a report which gives specifications for heat-resistant steels used in aircraft turbine engines. A large part of the report is a translation of specifications for special steels, most of which are said to be inferior to comparable American steels. Compositions of nonferrous alloys are given. PB-50349; photostat \$6.00; microfilm \$2.00.

Steel Testing—Supersonic methods developed in Germany during the war are described in this British report. The report also describes how Geiger-Mueller counters were used to measure wall thickness of long pipes and high pressure gas bottles. PB-25556; photostat \$1.00; microfilm \$1.00; mimeographed 25¢.

Iron in Light Metals—Prepared for a German air research agency, a translated report states that time loss in the determination of iron in light metals can be avoided by a colorimetric procedure using sulfosalicylic acid. The test gives reproducible values in the presence of almost all the possible alloy elements and impurities. PB-53890; photostat \$1.00; microfilm \$1.00.

Regeneration of Pickling Solutions—The original strength of spent pickling liquor can be restored by the addition of ethyl alcohol followed by fractional distillation, according to a German technical monograph. Four methods used to evaluate or regenerate old and super-concentrated pickling liquors are discussed. PB-44958; photostat \$1.00; microfilm \$1.00; 6 p.

Vitreous Enameling—According to a British report, sodium titanium silicate proved so successful as a wartime substitute in vitreous enamelware that its use may be continued. Enamels based on V-26 contained from 10 to 20 pct of this material and needed no additional opacifier to produce a dense white finish, the report states. It was used in cover coats on sheet steel and ground coats on cast iron. PB-60903; photostat \$5.00; microfilm \$2.00; 62 p. Microfilm or photostat supplement; \$1.00; 13 p.

Aluminum Radiators—Aluminum tubular radiators which resist corrosion in soldered areas can be made by dip soldering according to this German Air Research Ministry wartime report. The report, in German text, claims that corrosion of aluminum caused by water in the soldered areas of radiators was prevented by use of a eutectic mixture of zinc and cadmium with an intermediate layer of iron. PB-36637; microfilm \$1.00; photostat \$2.00; 29 p.

Accident Prevention—German-developed safety appliances and research on problems of industrial accident prevention, efficiency and physiology are discussed in this report. The report includes detailed descriptions of government regulatory activity, safety research centers, legal first aid requirements and standard emergency medication and methods used in large factories. PB-6364; microfilm \$2.00; photostat \$11.00; 154 p.

New Equipment...

Contour boring and turning machines, hydraulic inclinable presses, spot and projection welders, microhoning equipment, convertible diecasters and polishing machines for handling flat stock are described in this week's issue. Also featured are industrial trucks equipped for reel handling or for pouring molten metal, quenching rings, fire insulating brick, self-sizing dowel pins, and water-cooled burners for steel mill furnaces.

Boring and Turning Machine

A CONTOUR boring and turning machine for performing precise second operation work has been developed by *New Britain-Cridley Machine Div.*, New Britain, Conn. In addition to the regular jobs



of straight boring and turning, facing and chamfering, the compound action obtained from contours on the two cams is said to direct the single point tool in producing lands, steps, recesses, flanges, counterbores and radii. This tool is fed free to the bottom of the bore and cuts on the draw-back stroke. For jobs too complicated for a single point tool, a tool cluster may be arranged. Either work or tool may be held in the spindle. The machine is cam and air actuated. Two models are produced and spindle speeds up to 6000 rpm are available.

Hydraulic Inclinable Press

ANNOUNCED as the first all-hydraulic inclinable press, the Economy Press designed by the *Hydraulic Press Mfg. Co.*, Mount Gilead, Ohio, is described as combining the advantages of hydrau-

lic design with high speed. The press is rated at 100 strokes per min and has a pressure capacity up to 50 tons. Pressure is applied by a direct-acting hydraulic ram, incorporating booster rams for rapid traverse. The press closes at 984 ipm, works at high pressure at 84 ipm, and opens at 790 ipm. Ram action provides straight motion without side thrust, it is claimed, and ram speed is adjustable. Power is supplied by a 7½ hp, 1800 rpm motor direct connected to a radial

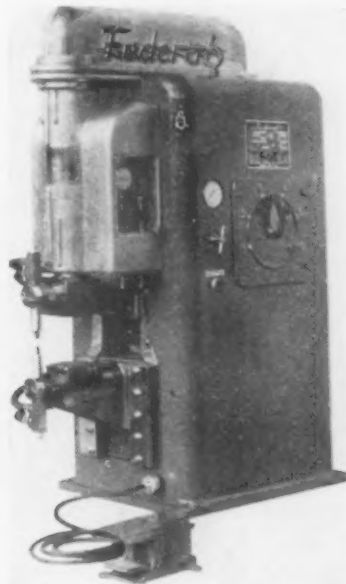


pump. Pressure output of the pump is adjustable from 15 to 50 tons. Working stroke is 4 in., 1 in. at max pressure. The machine, equipped with hydraulic tilting control, can be tilted to angles of 10°, 20° or 30°.

Spot and Projection Welder

ANNOUNCEMENT of an improved general purpose air-operated bench type combination spot and projection welder for welding mild steel, stainless steel and aluminum has been made by

the *Federal Machine & Welder Co.*, 16 Dana St., Warren, Ohio. The machine is equipped with a special low inertia rubber head with microswitch firing. A vertically adjustable lower knee is standard as are the horns and water-cooled

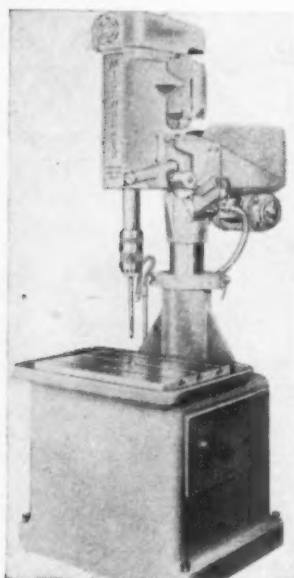


point holders. A 30 kva transformer, contained within the frame, has 6 steps of heat regulation which are controlled by a tap switch arrangement. The unit has a 2¼-in. stroke which is actuated by an air-operated double-acting cylinder. Throat depth from the machine face to the center line of the electrodes is 6 in.; from the machine face to the center of platens, 4½ in. T-slot platens are optional equipment.

Microhoning Equipment

KKNOWN as the Microhoner machine and Micromold utility tools, a new line of microhoning equipment designed for general toolroom use, semiproduction, and

salvage or reconditioning work is offered by *Micromatic Hone Corp.*, Greenlawn St., Detroit 4. The Microhoner Model No. 717 is an all-mechanical machine with the stroke, reciprocation and rotation speed and head to table distance adjustable so that one machine may be used to microhone a range of bore diameters from $\frac{1}{2}$ to 4 in. The tools are designed to cover a wide range of types and sizes of bores with diameters from 1 to 4 in. The sticks used in these tools

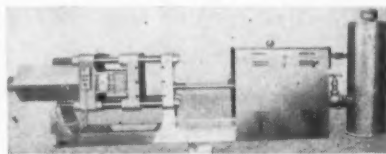


have the abrasives encased in plastic stone holders, eliminating the need for steel stone holders, shells and expanders.

Convertible Diecaster

CONVERTIBLE from normal cold chamber operation to optional hot chamber operation, a heavy duty hydraulic operated diecasting machine has been announced by *H. L. Harvill Mfg. Co.*, Corona, Calif. As a cold chamber machine the equipment normally casts aluminum, magnesium and copper-base alloys although zinc, tin and lead alloys may also be cast cold chamber. The alloys are hand-ladled from a holding furnace adjacent to the machine into the cold chamber injection assembly. As many as 300 shots of molten metal may be made per hr. The metal is injected into the die cavities under pressure ranging from 3400 to 11,800 psi, pressure being controlled by the piston size, which is related to the volume of the metal

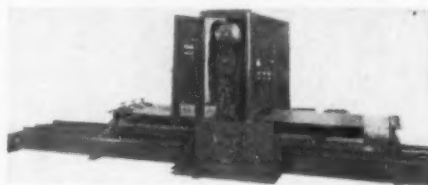
required to fill the die cavities. The machine is capable of casting up to 11.6 lb of aluminum alloy, or an



equivalent volume of other materials. Conversion to hot chamber operation is accomplished by the installation of a self-contained conversion unit, consisting of a holding furnace beneath the injection cylinder, a blower and temperature control unit, a metal pump assembly with motor and a hot chamber injection assembly. Zinc, tin and lead alloys can be cast by the hot chamber method. Operation may be fully manual or semiautomatic.

Polishing Machines

A LINE of 2-roll abrasive belt grinding and polishing machines for flat polishing ferrous and nonferrous metals has been introduced by *Hill Acme Co.*, 6418 Breakwater Ave., Cleveland 2. Three general types are available: strip type for processing strip material in coiled form; plate or bar type, which incorporates the use of feed or pinch rolls for conveying the material under the polishing head; and the sheet type with reciprocating hydraulic table drive. Machines are built in a progression of widths up to a maximum of 60 in. Endless coated abrasive belts 10 ft 6 in. long are used on the units.



The 2-roll vertical polishing head is the same for the three types of machines and covers basically a dynamically balanced upper steel idler roll and a lower rubber-covered contact or work roll over which the abrasive belt travels. The rubber-covered contact roll being the driving roll, is said to eliminate slippage of the abrasive belt. A pneumatic belt centering device assures positive tracking of

the belt, and is adjustable to accommodate various abrasive belt widths. All principal parts of the machines are of welded steel.

Industrial Arcwelders

A LARGE illuminated uniformly calibrated current indicating scale is the dominant feature of a new line of industrial type ac transformer welders announced by *Hobart Bros. Co.*, Troy, Ohio. The dial is of translucent plastic, illuminated from within by a 110 v



lamp, making it easy to read from a distance in either light or dark locations. The light also indicates that the transformer is energized. The welders are all of the moving coil type with no adjustable magnetic paths. Adjustment of current is made by means of a knob on a steel disk that serves as the drip proof top cover of the case. The welders have a high full load efficiency and an exceptionally low no load input, it is said. The circuit reactance and the no load voltage are so balanced as to make arc starting prompt and easy for any thickness of metal. These welders are offered in 300 and 500 amp sizes for operation on single phase, 60 cycles supply current, either 220/440 v or 550 v.

Hydraulic Cylinders

A NEW line of standard hydraulic cylinders, the body of which is centrifugally cast semi-steel with a tensile strength of 40,000 to 50,000 psi has been announced by *Hydro-Line Mfg. Co.*, Rockford, Ill. Cylinders are bored and honed

NEW EQUIPMENT

and the standard line includes all conventional types of mounting. Construction includes a $\frac{1}{2}$ -in. cushion at each end, and C ring packing with three rings plus the header and follower are incorporated in the design. They are rated at 1500 psi capacity, the line ranging from $1\frac{1}{2}$ through 8-in. bore with stroke to suit.

Power Transformers

A COMPLETE line of power and lighting transformers in sizes from 1 to 100 kva is manufactured by the Transformer Div., Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12. Transformers, rated from 1 to 15 kva, are totally enclosed for outdoor and indoor use. Transformers of standard rating are made to operate at rated frequency, and on any of the rated voltages up to 600 v. All transformers include a wiring compartment which is manufactured with knockouts to facilitate any conduit arrangement.

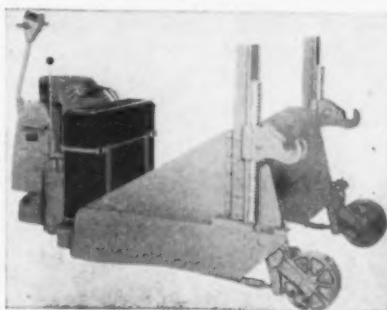
Quenching Rings

QUENCHING rings in sizes ranging from 4 to 18 in. ID for use in semiautomatic hardening of gears and similar parts have been made available by Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23. The rings are interchangeable and are designed for use in a standard Rotoheating and quenching unit and tank for hardening gears or similar parts ranging from 2 to 16 in. in diam. Gears are dropped into the lead coil and heating and quenching take place automatically. The part is rotated slowly during the heating cycle to insure uniform penetration; after the current is cut off, a water spray, from several hundred openings in the quench ring, quenches the part while it still rotates. The quench, also, is automatically cut off.

Reel-Handling Truck

MOVING, hauling, storing, winding and unwinding reeled cable, wire or hose may be accomplished by push-button control with an electric industrial truck, announced by Automatic Transportation Co., 149 W. 87th St., Chicago 20. Designed to simplify reeling

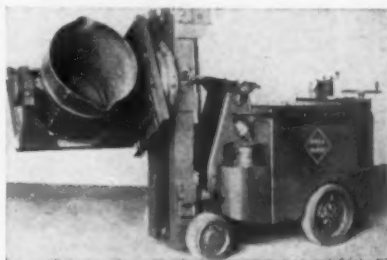
and unreeling as well as horizontal movement, the unit has been built to handle up to 6000-lb loads of any commodity wound on spools from 3 to 7 ft in diam and up to 33 in. wide. The reel handling mechanism consists principally of adjustable hooks, mounted on locking



gear racks, in which the reel axle rests, and hinged trailing wheels which raise the load from the ground when drawn forward by the electric lift. It is stated that one man can lift 3-ton reels from the ground by guiding the truck beneath the reel axle and pushing the electric lift button. The axle rotates within the hooks while winding or unwinding is performed.

Foundry Ladle Pallets

MOLTEN metal can be poured from foundry ladles by means of power industrial trucks having rotating heads and fork and a ladle mounted on a base equipped with built-in sleeve pallets, Etwell



Parker Electric Co., Cleveland 14, has announced. The new ladle and system provide for direct transport and pouring. The ladle is supported on trunions in a frame of welded steel plate. It is 29 in. diam unlined. Two sleeve pallets are welded in the base of the frame. The fork engages the sleeves in the base of the ladle which is held firmly in position for tilting and pouring. The rotating head is detachable and the fork itself can be

attached directly to the truck's elevating mechanism thus providing features of the standard fork type truck for a wide range of purposes.

Utility Racks

STANDARDIZED utility racks on wheels in 2, 3 and 4-shelf units are now being produced by Palmer-Shile Co., 16005 Fullerton Ave., Detroit 27. The racks were developed for handling parts or small items in production or assembly. They are of welded steel construction and the rack shelves are available with flanges up or down. Standard dimensions are 30 in. wide, 48 in. high, 54 in. long overall, with 12-in. clearance between shelves for the 4-shelf model; 24 x 36 x 42 in. and 12-in. clearance for the 3-shelf rack; and 20 x 32 in. with 19-in. clearance between shelves for the 2-shelf rack. All-metal wheels or moulded-on rubber tires are available.

Bumper Guard

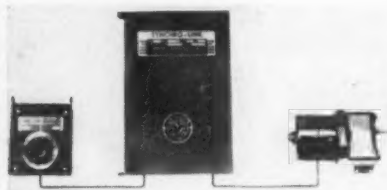
AN enlarged bumper guard, made of $\frac{1}{2}$ x 6-in. formed steel plate, has been designed for the Transporter motorized hand truck line made by Automatic Transportation Co., 149 W. 87th St., Chicago 20. Fitted over the former smaller bumper plate, which becomes a structural support in the new models, the bumper guard is easily removable if desired. It is positioned so as to protect the truck's drive and steering units, yet does not affect the truck's turning radius or maneuverability in any way, it is said, although it adds slightly to the overall length.

Fire Insulating Brick

A BRICK, half the weight of a standard fire brick, measuring $2\frac{1}{2}$ x 4 x 8 in. and having a high degree of insulation because of its porosity and lightness, has been introduced by Welding Equipment & Supply Co., 223 Leib St., Detroit 7. The Eureka brick is a mass of trapped air cells, each one of which is a fortification against heat conductivity. It is claimed this brick can be easily sawed and shaped to fit, even with a wood saw. The brick can be used as a bench fire brick for welding purposes as well as for insulating brick for furnaces.

Positioning Controller

CALLED the Synchro-Link, type SL3, a remote positioning Servo control said to quickly and accurately position one or several distant motors according to the setting of a master control dial, has been announced by *Yardeny Laboratories, Inc.*, 105 Chambers St., New York 7. Accuracy is independent of the load. Two adjustments are provided: sensitivity control which is a 3-position switch providing 3 steps of accuracy, and an anti-hunting control, a 4-position switch for extending the range of anticipating over a suitable portion of the full range. These adjustments are set once for all for each application. The Synchro-Link works on the principle of a self-balancing electronic bridge. The master control dial can be lo-

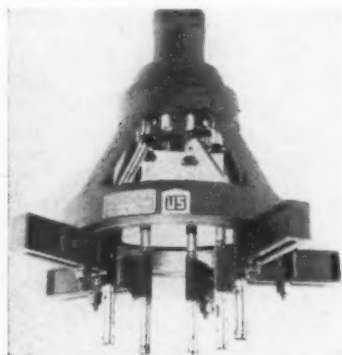


cated any distance from the controller up to several thousand feet. The unit has been designed to control the speed adjustment on variable speed transmission, the setting of motorized valves, volume dampers, pumps, machine tools and special machinery. Controller contacts will handle up to 15 amp, 110 v ac and up to 10 amp, 220 v ac, noninductive loads.

Multiple Drill Head

AN adjustable multiple spindle universal joint drill head, furnished with 2 to 10 spindles, each capable of drilling a 1/2-in. diam hole in cast iron, has been announced by the *U. S. Drill Head Co.*, 616 Burns St., Cincinnati 4. Standard spindles are furnished with No. 1 Morse taper; No. 2 Morse taper can be furnished, increasing the capacity of the spindles to 3/4 in. in cast iron. Spindles with No. 1 Morse taper can be adjusted to any hole pattern within a 10-in. diam circle, with minimum center distance between any two spindles of 7/8 in. Drilling area with No. 2 Morse taper spindles is 9 3/4 in. and the minimum center distance between two spindles is

1 3/8 in. The universal joints are of heavy duty construction, covered



with a neoprene hermetically-sealed cover and are lubricated for life.

Gage Blocks

MICROGAGES are now made in 7/8-in. diam size the manufacturer, *Van Keuren Co.*, 176 Waltham St., Watertown, Mass., has announced. This increase in diameter is said to result in a gage which has 60 pct more wearing surface and wringing quality. It also provides extra rigidity in the 2, 3, 4 and 6-in. blocks. The new microgages are available in 5, 7, 16 and 35 block sets, the 35 block set giving combinations in ten thousandths from 0.300 to 14 in.

Self-sizing Dowel Pin

ADOWEL pin has been introduced by *E. A. Baumbach Mfg. Co.*, 1812 S. Kilbourn Ave., Chicago 23, which does away with jamming or sticking when being driven into the hole, it is said. It is knurled on one end, hardened and centerless ground to 0.001 in. oversize. This knurled end acts as a shear when being driven in, sizing the hole and at the same time removing any irregularities left by drilling or reaming. The body of the dowel pin and the knurled section are the same diameter. The pin stays tight, yet can be removed easily and reused, it is said, with the same tight fit assured. These Rite-Fit dowel pins are produced from special alloy steel of high manganese content.

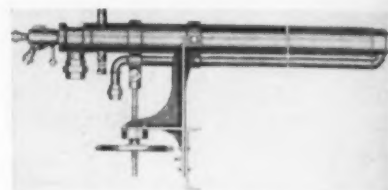
Liquid-Plastic Coating

CALLED Redskin, a protective, liquid-plastic coating for polished or bright metal has been developed by *Dennis Chemical Co.*,

2700 Papin St., St. Louis. The coating, applied by spray, brush or dipping, dries quickly forming a tough, elastic film that is said to be impervious to rust, chemical reaction, smears or normal handling. To uncover the bright surface, the edge of the coating is picked up with finger nail and peeled off in one continuous strip, it is said. Parts protected with this coating may be completely fabricated before removing the protective skin.

Water-Cooled Burner

AN artillery type water-cooled burner for steel mill furnaces designed to place atomized fuel in furnaces for speeding up the melt has been developed by the *Crowe Engineering Co.*, Elmwood Place, Cincinnati. The burner is described



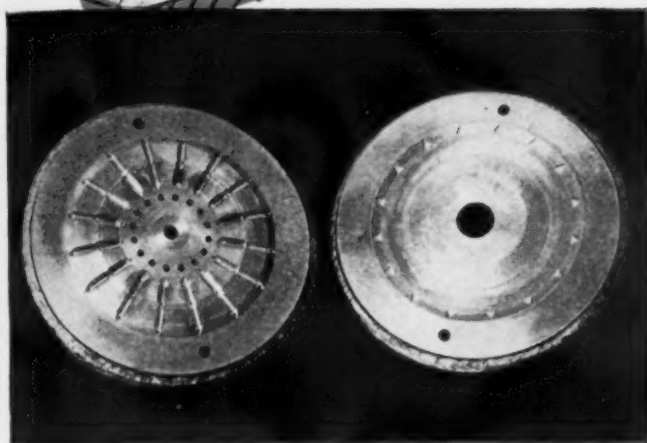
as practical and effective during an entire melt down and for melting down scrap. This type is said to operate equally well with oil, or pitch and gas combination. The burners are equipped with adjustable atomizers which atomize the fuel and eject it in a fine spray. The burner can be used with or without doghouse.

Furnace Lighter

AFURNACE lighter designed to stay lit continuously, regardless of the atmosphere or back pressure in the furnace, has been released by the *Sunbeam Stewart Industrial Furnace Div.*, 4433 W. Ogden Ave., Chicago 23. Instead of using an exposed flame, combustion is centered in a perforated heat resisting alloy nozzle tip which is heated to incandescence. The mixer assembly is adjustable through valve control. The lighter uses a mixture of gas and air and is connected through a light, flexible hose to the low pressure air and gas supplies. Length of the lighter is 3 ft from mixer to burner and can be obtained in multiples of 3 ft. Flexible hosing is 10 ft long, and is available in additional lengths of 1 ft.



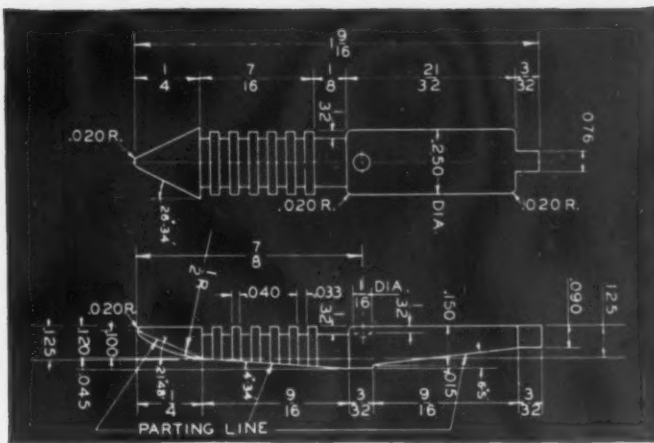
How to Mill an intricate 16-Cavity Injection Mold complete..averaging 8³/₄ hours per cavity!



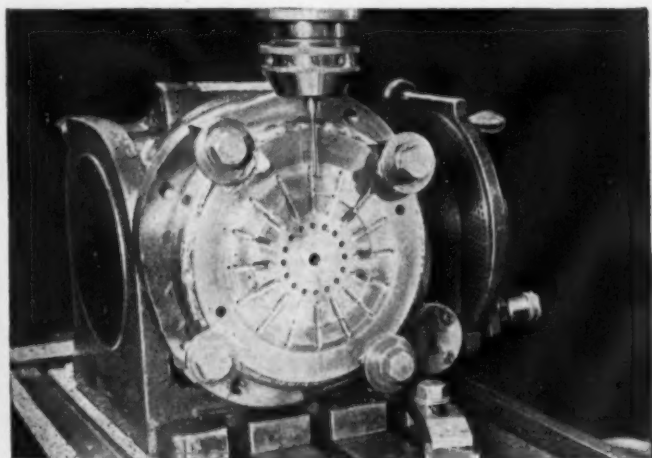
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FAST! Both halves of this 16 cavity injection mold for an ink feed part for desk pens milled complete and ejection pin holes spotted in 140 hours! That's typical performance of a Kearney & Trecker — Milwaukee Model 2D Rotary Head Milling Machine on difficult mold making jobs.

2



DIRECT! These multiple contours were transmitted direct from print to mold block. No fussing with templets or models. One cavity accurately located and each operation successively duplicated after indexing on a dividing head. That's the Rotary head method of "multiple origination."



3

ACCURATE! Single setup reduced chance for error. Operator relied on built-in precision control and measuring devices for precise end results. Ejector half tipped 90° and special cutter used to square groove corners.

*Job Data Courtesy of
Sengbusch Self Closing Inkstand Company*

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN 4718

4

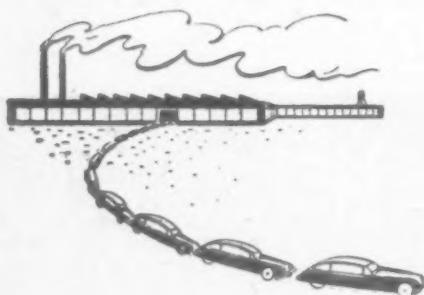


For more facts of how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

Assembly Line . . .

WALTER G. PATTON

• Pontiac dealer hits back at critics . . . GMC introduces its new truck line . . . Walter Reuther accuses the steel industry of "planned scarcity."



DETROIT—Apparently some auto dealers, stung by the criticism heaped on them by the public and the press, have decided to do something about defending themselves.

A newspaper advertisement appearing recently in the Bay City (Mich.) *Times* shows one thing that can be done.

While the experience of the Pontiac dealer in Bay City may not be typical of the industry as a whole, the facts about his business as attested by the dealer appear to contradict flatly the public's conception that sales of postwar cars invariably require a trade-in, that a large percentage of cars sold by dealers are being resold at a premium price, and that it is impossible to buy a new car without purchasing a large number of unwanted accessories.

In a recent paid advertisement, Dunlop Motor Co. of Bay City stated that of 141 new cars, only two cars are known to have been resold by the original owner at a premium price.

"This indicates that considerable care has been taken by Dunlops," the ad said, "in distributing cars to those people who are sincerely interested in new cars as transportation and not as a means to exorbitant black market profits."

A complete breakdown of distri-

bution of its 141 cars is contained in the advertisement, showing that 45 farmers, clerks and factory workers had received new Pontiacs. The next largest classification was salesmen, 37, followed by wholesalers and retailers, 30. Doctors, clergy and other professional persons received 18 cars and business executives got 7 of the new Pontiacs. No information was given as to duplicate sales to the same customer.

Stressing the fact that "You can buy any Pontiac with only the equipment you order," the dealer's ad showed that the delivered price of \$1647.86 for a Pontiac Eight included license plates, ALL taxes, a tank full of gas, bumpers, bumper guards, spare tire and wheel and an extensive list of what would be considered necessary. Fog lights, spot lights, mirrors, radios and heaters were conspicuously absent from the list.

If Dunlop is a typical auto dealer, certainly the real facts about automobile sales have been badly distorted before reaching the public. Just why more statements of this kind—if they are typical of the industry as a whole—have not been made available to the public by dealers and the auto manufacturers themselves will have to remain as one of the mysteries of the automobile business.

FOLLOWING closely on the heels of the Chevrolet new truck announcement, GMC announced its 1947 truck line this week.

Increased horsepower in the heavy-duty group for both its gasoline and diesel lines is featured. Radiator grille, hood and front fenders have been restyled. Cabs have been redesigned to give increased visibility. According to the GM announcement, stronger front and rear axles are being used and heavier frames have been specified in the latest models.

The new cabs are $3\frac{3}{4}$ in. longer and $9\frac{5}{8}$ in. wider than those of the previous light and medium duty models. Windshields and door and window openings are larger. The all-steel welded doors are nearly 6 in. wider than the previous models.

Mounted on a tubular frame, the cab seat is adjustable over a dis-

tance of $3\frac{3}{8}$ in. The number of seat cushions has been increased from 40 to 73.

As in the case of Chevrolet, deluxe cabs have rear quarter corner windows for improved visibility. The new heavier frames having a nominal depth of 9 in. in the $1\frac{1}{2}$ to $3\frac{1}{2}$ -ton models provides a section modulus that completely eliminates the need for frame reinforcements according to GM engineers. Front spring members are longer; rear spring cross members have been strengthened.

Two new models have been added to the light and medium duty lines. The new light duty model is rated at 11,000 lb gross vehicle weight and the new medium duty model is reported to have carrying capacities equal to those of prewar heavy-duty models.

Horsepower of the engines in GM's heavy-duty lines has been boosted 10 pct while the ratings of both the 4 cylinder and 6 cylinder diesels have been increased 21 pct. Other improvements in the heavy duty group include re-engineered front springs, improved ball-bearing steering, worm drive rear axles for six wheelers, power shift control for two-speed rear axles and new double reduction rear axles.

A heavier I-beam used in the 1947 diesel models is said to have increased the front axle strength 32 pct.

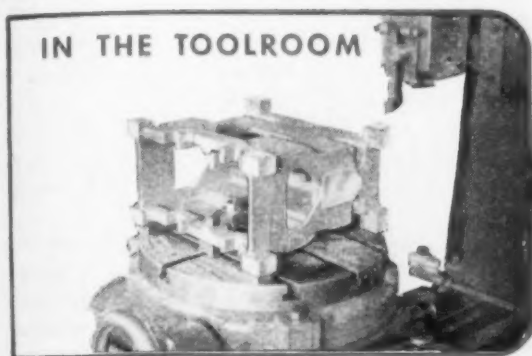
It is expected that production of the new GMC models, already under way, will be increased as rapidly as the flow of materials will permit.

WALTER REUTHER, president of the UAW-CIO and "the man with a plan for just about everything" got around to the steel industry this week. Testifying before the Senate Small Business Committee Reuther accused the steel industry of "planned scarcity plainly calculated to enhance profits and to fortify their monopoly hold over this basic industry."

The program advocated by the steel industry, Reuther said, would hold the auto industry to production of 3,750,000 vehicles in 1950 whereas 6 to 7 million new cars would be needed. According to Reuther's statistics, steel produc-

Here is Convenience that Cuts Working Time

P&W
VERTICAL
SHAPER



IN THE TOOLROOM

Thirty-five irregular slots and surfaces of this box jig were machined without a change in setup.



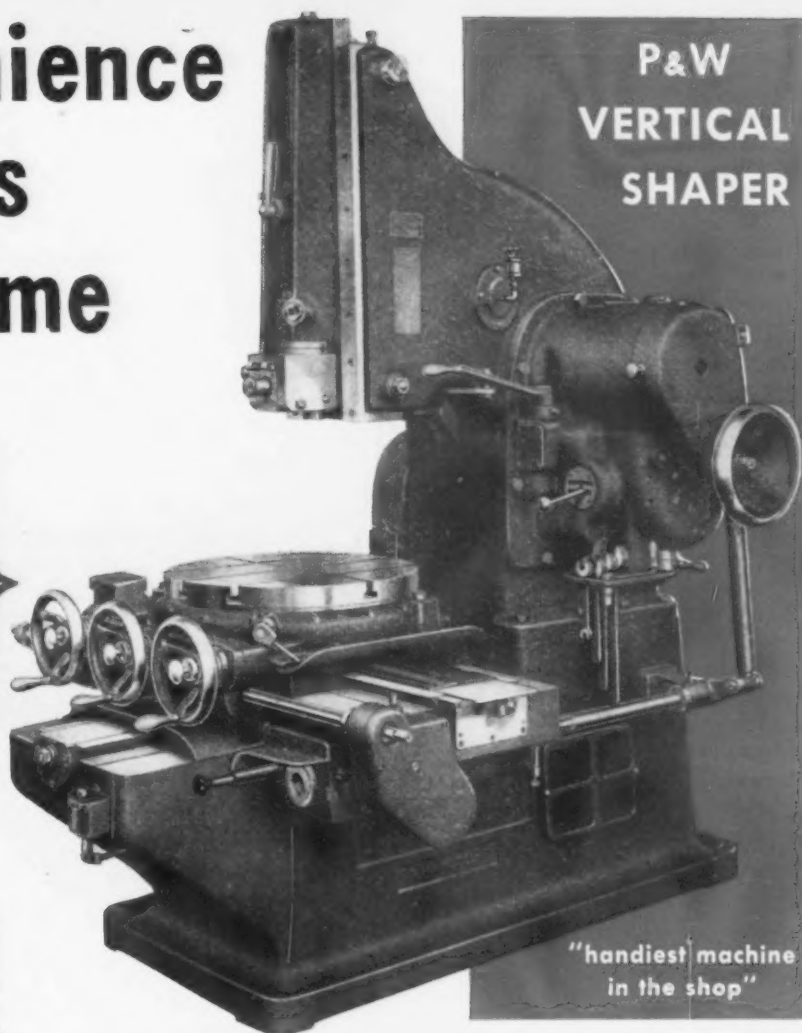
IN THE DIE SHOP

Irregular contours in this die and die-shoe were machined in 8 1/4 hours. How long would your present equipment require?



IN THE REPAIR SHOP

(Left) All machined surfaces reached without changing setup. (Right) Special cam-former, a one-time job, produced in 3 hours.



"handiest machine
in the shop"

It's a pleasure to see a P&W Vertical Shaper in action and fully realize all it can do. Hundreds of foremen agree that it is "the handiest machine in the shop."

Here in one tool are combined longitudinal, transverse and rotary table feeds with a vertical ram motion. The possibilities of this combination have proved to be almost without limit.

It's easy to strap work in place on the horizontal table . . . easy to reach all vertical surfaces without changing setups . . . easy to follow the tool's progress along layout lines as it enters the work. Notice that all tool pressure is down against the solid bed. If you are machining a die, simply adjust the ram to the relief angle you want, and cut at that angle.

Look at the jobs pictured here. Then judge for yourself how the P&W Vertical Shaper can save time on your work. Write today for complete literature on "the handiest machine in the shop."

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT



tion of 80 million tons would mean 14 million unemployed workers in 1950 and at least 200,000 auto workers out of jobs.

Reuther's line of argument has a familiar ring to the auto industry which, from time to time, has been accused of holding plant capacity far below Reuther's idea of the level necessary to insure full employment in this country.

According to the UAW-CIO president, the steel industry has failed to make allowance for the growth of per capita steel consumption in this country. He objected to the fact that the steel industry has "included with fine impartiality the great depression of the thirties and the prosperous years of the twenties in their appraisal of the past." Apparently, in Reuther's opinion a brand new set of estimates which ignores these particular years is necessary to appraise the market for steel properly.

While no official comment on Reuther's testimony is expected from the automobile industry, no one could be found here this week who would confess he saw eye-to-eye with Mr. Reuther in his predictions of calamity by 1950 because of a lack of steel. The plain fact is that the auto industry would indeed like to have more steel. And few auto executives can see any real relief as to steel availability for months ahead. Some executives are genuinely concerned as to whether or not there will be sufficient ingot capacity to meet the auto industry's flat-rolled steel requirements for the next year or two.

Where the industry differs sharply with Reuther is that the industry, with only a few excep-

tions perhaps, feels no compulsion to tell the steel industry how much capacity it should install. If the steel industry can see its way clear to install additional capacity, the auto industry will be pleased. However, it recognizes that the steel industry itself is the final judge in such matters.

AS one source expressed it, "I see no reason why anyone, inside or outside the steel industry who has full confidence in Mr. Reuther's estimates of future steel requirements should not get into the steel business immediately and clean up on what Reuther apparently feels is the shortsightedness of steel executives. If the auto industry was as sure of Mr. Reuther's projections as he is it might even enter the steel business itself although attempts to do this in the past have worked out rather badly. The fact that Reuther would put the government into the steel business must mean that he has little confidence that any private buyer of his statistics is going to be found."

Similarly, Reuther's charges of "big business featherbedding" have found practically no support. Assuming it is true, as claimed by Reuther, that the percentage of cold-rolled steel sold to the automobile industry increased from 37 pct in 1940 to 55 pct in the first quarter of 1947, most sources here would discount this higher figure because of the fact that handmills with an estimated capacity of 1,800,000 tons have been retired during the period. It is also recognized that changes in certain sales classifications during the past 7

years as well as modifications in mill product mix have contributed to the present situation. The auto industry would definitely like to have more hot-rolled steel. However, it can recall that the auto industry, too, has changed the nature of its output since 1940. For example, the industry is now making a much larger percentage of trucks, it is building a larger percentage of convertibles, and it is certainly using more flat-rolled steel for replacement parts than at any time in its history.

Curiously enough, it has been pointed out that the UAW-CIO's brother, the United Steel Workers-CIO who ought to be at least as much concerned about the problem of steel production capacity as the auto workers have been strangely silent during Reuther's present criticism of the steel industry.

Monsanto Will Operate Atomic Research Center

Dayton

• • • Nearby Miamisburg, with a population of 8000, is expected to become one of the most important atomic research centers in the United States. This site was selected by the Manhattan District, predecessor of the Atomic Energy Committee. Construction of the project was authorized last September and construction work at the new site began in December. Monsanto Chemical Co. will operate a new laboratory for the AEC and will engage in the investigation of basic chemical problems in the field of atomic research.

The personnel of the Monsanto Chemical Co., numbering approximately 450, will conduct fundamental chemical studies in the nuclear sciences, and will develop and test processes, procedures and techniques which will be applied to the operation of that nation's atomic energy program.

A portion of the facilities will be underground in order to obtain conditions necessary to certain types of laboratory work. Kenneth A. Dunbar, area manager for the AEC, is working closely with George C. Gabler, project manager in charge of construction for Monsanto. Dr. Malcolm M. Haring will be laboratory director at Miamisburg.

PAINT LABORATORY: This resin research department on the ground floor of the recently opened laboratory of the Arco Co., Cleveland, provides facilities for the examination and study of phenolic, alkyd, and other synthetic resins from the flask stage up through pilot plant production.



T & W FORGINGS

**USUALLY COST LESS
AT THE POINT OF
ASSEMBLY**

Quality control, as practiced at T & W, begins with the chemical analysis of steels and involves the control of operations prior to, during, and at the conclusion of the forging production processes. The purpose of T & W quality control is to assure conformity of materials, and completed forgings, to specifications. The reduction of rejections and checking time made possible by T & W quality control procedures will provide you with notable cost advantages. Ask a T & W Forging Engineer about quality control techniques, and the uniformity of physical properties obtainable in T & W forgings that usually cost less at the point of assembly.



A B D C

A—With this modern tensile testing equipment the tensile strength and other physical properties of steels for T & W forgings are accurately and speedily determined.

B—Micro examination of the grain structure of billets, bars and rods usually reveals the presence of elements that might lead to service failure of parts when these results are considered in conjunction with the results of other tests.

C—The chemical laboratory includes apparatus with which to accurately determine the analysis of the elements present in steel.

D—The measurement of the relative toughness of metal and its resistance to impact is obtained by means of an impact test, utilizing this combination Izod-Charpy impact testing machine.

★ ★ ★

At T & W a completely equipped laboratory under the direction of a Chief Metallurgist is housed in a building especially constructed for the performance of quality control functions.



TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

Washington . . .

EUGENE J. HARDY

• Industry asked to organize 2500 standby units for reserve duty . . . Would provide trained service and supply troops in national emergency or war.



WASHINGTON — Barely recovered from the effects of World War II, American industry has already been called upon to play a major part in present plans for creation of a large pool of reserve service units, ready for immediate mobilization, should this nation again suddenly find itself at war. Reserve service troops will be provided by industry in the form of units organized in specific plants ready for instant action with all equipment required by their respective trades.

Speaking in Chicago last fall, President Truman reminded the nation that "if there must be a next time, we are likely to be the first target and so, on short notice, each man must be ready to take his place and go forward—not at the end of a few months or a few years, but immediately."

It is also generally assumed that any future war will not only be undeclared prior to attack but will begin with a surprise raid—not on an outpost, as is the case of Pearl Harbor—but on key points on the continent itself. It is on this basis that the War Dept. is building its program for organization of upwards of 2500 service units within

industry as part of the nation's military reserve.

NO authority will go so far as to predict where the enemy would choose to strike first, should such attack be made against the United States. However, military sources admit that successfully staged raids, either simultaneously or in quick succession, against the six cities of St. Louis, Chicago, Detroit, Cleveland, Pittsburgh, and Washington would amount to a major disaster, speaking mildly. In one swoop, a paralyzing blow would be dealt to six of the more important centers affecting communications, transportation and manufacturing.

The Army's industrial reserve plan has been laid down for the purpose of minimizing and making the quickest possible recovery from the effects of such attacks, should they ever occur. Through this blueprint for action, trained service type units would be ready for instant mobilization, ready for assignment by Army commanders to regions where the regular and reserve tactical units need them most, for the restoration of industrial and other facilities, as well as for performing the usual supply functions. Also, still others could move into unharmed industrial areas to direct the activation of standby plants and conversion of others to war production in the fastest possible time.

The Affiliated Units, as the industrial reserve groups are called, will hold exactly the same status as the Organized Reserve — of which they are actually a part and parcel. While reservists voluntarily obligate themselves to serve in the military forces when needed, unlike the National Guard, the reserves are not called out for active duty until the President proclaims a national emergency or Congress declares war.

Normally, from 15 to 20 service personnel are required to support each man in actual combat service; more than 20,000 active units were serving on VJ-Day. In future conflicts, the ratio conceivably could be higher. Obviously, the peacetime Regular Army and National Guard cannot include in their peacetime setup sufficient service type units

to provide necessary support in the event of sudden mobilization. It is the Organized Reserves to which the military forces must look for such units.

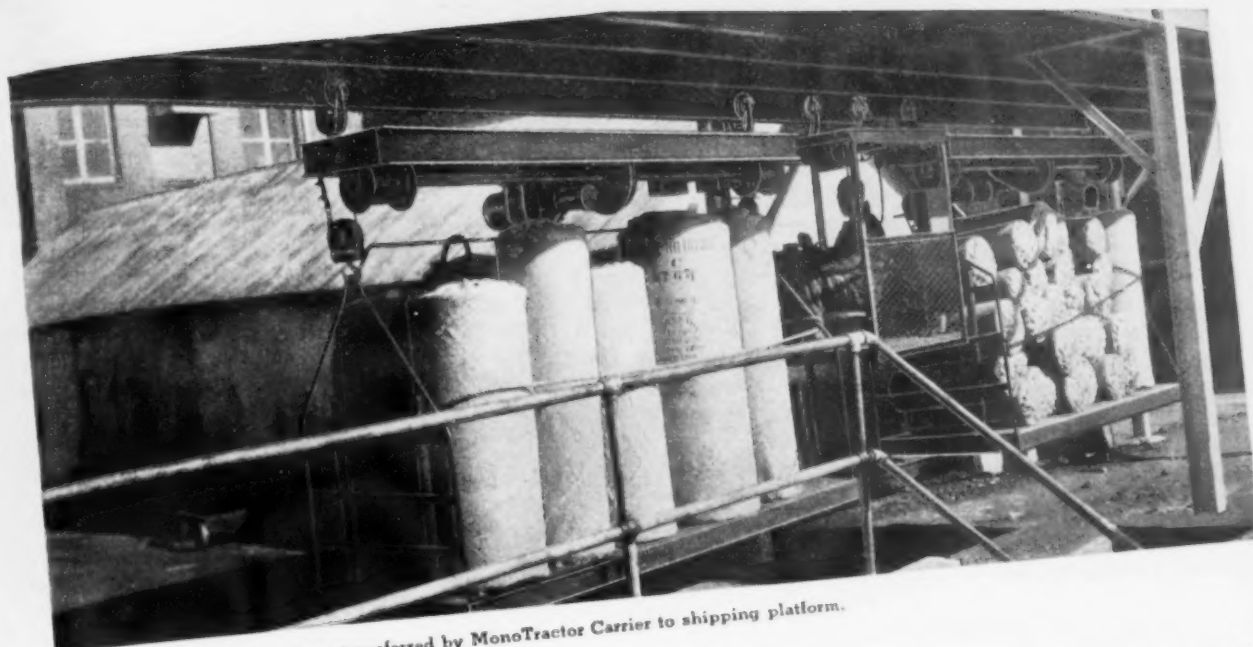
THROUGH organization and training of such units in peacetime, the time element for mobilization is shortcut by elimination of the period normally required for recruiting-drafting, screening of thousands of men for skills and aptitudes, and training them for organized field operations. These necessary steps have not only been time-consuming in the past but inevitably resulted in many square pegs being fitted into round holes.

Members of Affiliated Units will normally be drawn from the employee ranks of the sponsoring organization (firm or company) although a sponsor may "adopt" a unit already organized, for instance, where a number of the proposed sponsor's employees are already members of a unit of the Organized Reserve. These units would be given training in adapting the lines of work with which they are most familiar to military purposes.

The War Dept. warns against a sponsor mobilizing himself out of business—in other words, drawing on his working force for unit personnel to such an extent that his operations would be crippled in the event of the unit or units being called to active duty. A sponsor may draw on outside sources for filler personnel, it is pointed out.

Generally speaking, many of the Affiliated Units formed within the iron and steel industry would be assigned to the Engineer Corps and Ordnance Dept. With the former, there would be probable need for bridge building and repair, structural and other maintenance work; with the latter, there would be repair and maintenance of heavy machinery, vehicles and weapons. Some would undoubtedly make up Chemical Corps service units; others, machine shop and foundry-type units.

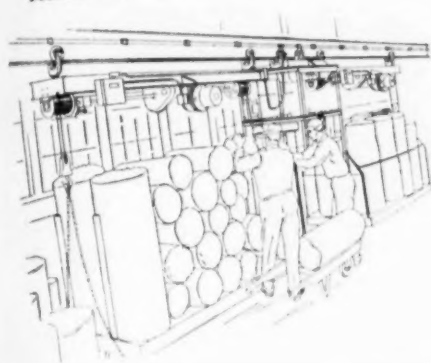
For example, steel companies will be asked to organize one or more of any of the following specific units: Chemical Maintenance, Chemical Service, Engineer Power,



8000 lb. loads are transferred by MonoTractor Carrier to shipping platform.

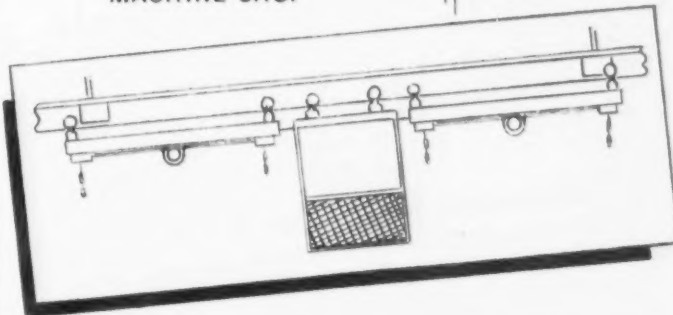
SHIPPING PLATFORM

Floor trucks are lifted by hoists on MonoTractor Carrier.



CLOTH ROOM

MACHINE SHOP



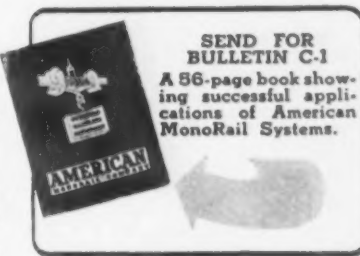
Overhead Transportation with MonoTractor Drive

There are very few limitations connected with American MonoRail Overhead Handling. This installation presented at least two problems — low head room and transfer of heavy materials over large areas and from building to building. The problems were solved by American MonoRail Engineers. The equipment consists of RailMaster Shielded Track, two twin hook hoists, with cab control, propelled by an American MonoTractor.

In operation just a short time, handling costs have already shown a very substantial saving.

Production has increased and manpower formerly used in lifting and hauling materials from one operation to another has been converted to more productive output.

Let an American MonoRail Engineer show you how to cut your overhead with overhead handling. This service is given without obligation.



THE AMERICAN

MONORAIL

COMPANY

13103 ATHENS AVENUE

CLEVELAND 7, OHIO

THE IRON AGE, July 31, 1947—73

Engineer Utility, Ordnance Ammunition, or Ordnance Depot units.

BY THE same token, the railroad, trucking and motor bus systems would be largely organized into Transportation Corps units for assuring uninterrupted movements of troops and supplies while maintenance units would be drawn from the manufacturing ends of these same industries. Obviously, units within the telephone and telegraph industries, as well as the electrical industries, would find ready berths with the Signal Corps.

As to how these plans would work out in the event of an emergency, the highly industrialized city of Pittsburgh—served by air, water, rail and motor transportation—might well be taken as a hypothetical example.

Should this city be attacked suddenly (bombed), Regular Army troops and the National Guard, as well as Pennsylvania's 79th Infantry Div. (ORC), would be called to the scene. However, the number of service units normally attached to these troops would be far too small for the job of digging out. But the commander of the Second Army would be able to draw on the industrial reserves (Affiliated

Units) for sufficient units to repair bridges and industrial facilities, restore rail, highway and water transportation, open up wire and radio communication, and otherwise perform needed support duty for the tactical troops patrolling or defending the area.

The commanding officer of an Affiliated Unit will be a reserve officer, equally acceptable to the sponsor and the War Dept. Other officer vacancies may be filled from rosters of the Organized Reserve or personnel from the sponsoring firm or organization who may obtain reserve commissions under certain conditions. Some units, of course, may not have a full officer-enlisted man complement; provisions have also been made to assign filler personnel from either the selective service or organized reserves should mobilization be necessary.

THREE types of units—A, B, and C—are provided. Class A units are those assigned to a full complement of officers and enlisted men; Class B is organized with a full officer strength and a cadre of key enlisted men, while Class C units would have a full complement of officers only. Classes B and C would draw filler strength from

selective service or bulk reserve personnel should they be called for active duty.

Since the purpose of these industrial reserves is to provide effective operating units for immediate mobilization, training schedules are provided just as for the National Guard and other Organized Reserves. Sponsors may choose one of several training plans—the one which appears to interfere least with normal civilian activity. These range from weekly to quarterly training sessions; some if selected also require a 15-day summer field training. Necessary clothing and equipment will be provided by the War Dept.

Industrial units may be terminated as military reserves upon written notice by the sponsor; likewise, personnel may resign individually upon presentation of a reasonable cause. And, of course, the War Dept. may cancel the service of either the unit or individual reservists for good cause.

More Plants Declared Surplus by Agencies

Washington

••• An additional 68 war plants and installations, including 34 military camps, depots and air fields, have been declared surplus by government owners, but have not yet been classified for disposition by WAA. Among them are the following plants (listed mainly by name of wartime operator):

Pacific Car & Foundry, Everett, Wash.; Continental Foundry & Machine Co., at Chicago and Wheeling; Andrews Steel Defense Corp., Newport, Ky.; Domestic Manganese & Development Co., Butte, Mont.; General Electric Co., Syracuse, N. Y.; Ozark Ore Co., Ironton, Mo.; Pittsburgh Metallurgical Co., Charleston, S. C.; and, the Wyodak Coal & Manufacturing Co. (Bloomington vanadium project), Idaho.

Also, Firestone Tire & Rubber Co., Akron; Bay Petroleum Co., Denver; Sun Oil Co., Toledo; Pacific Tire & Rubber Co., Oakland; Monsanto Chemical Co., Springfield, Mass.; Lac Chemical Co., Culver City, Calif.; Chandler Evans Co., Dayton, Ohio; Clinton Products Co., Kansas Ordnance Works, Parsons, Kans.; and the Long Horn Ordnance Works, Hanson county, Tex.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



**Sheffield quality assures
low cost**
Gage Performance



the **Sheffield** corporation

Dayton 1, Ohio

U. S. A.

{ Standard Gages
Shipped in 24 Hours }



2584

West Coast . . .

ROBERT T. REINHARDT

• Price of western scrap attracts eastern buyers . . . WAA is in ill favor in Portland area . . . India is excellent prospective buyer of heavy goods.



SAN FRANCISCO — Eastern iron and steel scrap buyers who have been prowling up and down the West Coast for the past several weeks will not return home overly impressed with western hospitality if their opinions are based on reactions of western steel producers to their visit.

Once again the relatively low prevailing prices for steel scrap in the West in the face of a rapidly rising eastern price have proved a magnet for eastern buyers who could, last week, well afford to pay the approximate \$17 freight haul to Chicago on top of the prevailing \$19.50 to \$22.00 price for No. 1 heavy.

Just as the western steel scrap supply began to approach something close to equilibrium, the sudden price increase in the East upset the market.

While prices were holding relatively firm on the Coast at the end of last week informed observers indicated that a moderate increase would probably be put into effect this week to protect the local supply from the invaders.

First evidence of instability in the scrap market with intimations for increased prices came from Portland, Spokane and other areas where western steel producers were not making heavy demands. Apparently the eastern buyers have been scouting the hinterlands in the hope of uncovering some scrap

which had not as yet gotten into the hands of dealers. Some negotiations with western dealers are known to be underway but as usual, there is considerable evidence that these local dealers are aware of the fact that over the long pull their loyalty to western steel buyers will pay dividends.

Steel production in the West is at a high level and operators are confident that it will remain there in spite of such difficulties as a tightening scrap market and gray market inquiries. Apparently the inquiry conducted by the Congressional Investigation Committee caused little more than a ripple among western manufacturers, although some indignation has been expressed because of inferences made that steel users were encouraging higher than list prices by patronizing the gray market vendors.

WEST COAST business in general showed a decline early in July, according to the Barth Index of Pacific Coast business. For the week ending July 12 business declined to 158.1 pct of the 1930 average, losing 3.2 percentage points from the preceding week. However, compared with the corresponding week of 1946, the index registered an increase of approximately 2 pct. From this report and similar statistics, there is no reason to believe that the Coast faces anything resembling a recession and on the contrary there is ample evidence of a general improved business condition.

In a review prepared by the California State Chamber of Commerce titled, "Factory Location in California," this organization points out that during the years 1945 and 1946 more than 2000 manufacturing plants, with a minimum capital investment of \$265 million, were built or announced and that more than 1700 factory expansions, entailing capital investment of \$303 million were actually begun. At the end of 1946 the factory employment in California is reported as having been 75 pct above prewar 1939 and factory payrolls 280 pct larger.

This booklet, prepared by the Industrial Plant Location Committee of the State Chamber, lists the complete bibliography of available studies and reference sources con-

cerning industrial sites, labor supply and costs, living conditions and costs, marketing and distribution facilities, raw materials, power, fuel and water supply, transportation, tax and license laws, community industrial surveys, and general economic surveys.

Additional information of value to any industrialist seeking a plant site is contained in the booklet which is available through the state organization.

PORTLAND—The WAA is in ill repute with a considerable segment of the local population because of its dilatory tactics and rejection of responsibility for the restoration of Swan Island to the city.

The Port of Portland has refused the most recent offer of WAA which was to turn over a portion of the personal property and assets of Swan Island Ship Yards to the port for \$400,000.

Swan Island was an airport at the start of the war when it was turned over to the government for ship construction and the city seeks to return it to its peacetime role as quickly as possible without expense to itself.

Disposal of this property has been hanging fire for many months with offers and counter offers between the port and the WAA with the Henry J. Kaiser interests in between making offers for the use of the property as an industrial site. This company now is reported as being uninterested and intends to withdraw in November.

It appears that when the original lease was made to the government, a rigid period of 10 years was stated and that no restoration clause was included. It now appears that the WAA is adamant in its stand to retain control under the terms of the original contract and is refusing to allow for restoration costs estimated at approximately \$1,350,000.

Approximately a year ago when the Kaiser interests offered to utilize the property for industrial purposes and to employ approximately 1500 persons, the Port Commission offered WAA \$250,000 for the buildings and contents. This offer was promptly rejected by the WAA which has continued to sell material and equipment from the property.

Unless some agreement is reached

The CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

Goodyear Tire & Rubber Co. are making a 30-foot rubber electric heating pad to dry the inks used in printing textile fabrics.

get ready with CONE for tomorrow

Farnsworth Television & Radio Corporation has the "Utiliscope", a television set that shows, in any room, a continuous picture of operations in a remote, inaccessible or dangerous part of a plant.

be ready with CONE for today

The Moore School of Engineering of U of P is building an electronic computer. It is reported that this new machine is faster than the famous ENIAC, will remember fifty times as many numbers and uses only 3,000 tubes, instead of 18,000.

get ready with CONE for tomorrow

The new Blaw-Knox equipment pulverizes coal by self-abrasion in a blast of super-heated steam.

be ready with CONE for today

The Marmon-Herrington 44-passenger trolley bus uses light metals to reduce weight to 17,230 pounds.

get ready with CONE for tomorrow

General Electric Company has two steam turbine generators under construction for electric power companies. These will use steam at 2,000 pounds pressure and 1,050 degrees and develop 125,000 kilowatts.

be ready with CONE for today

Western Pine Association hopes to cut lumber drying time to 4 hours by the use of acetone spray.

get ready with CONE for tomorrow

Flaw-free 90° creases can now be formed in thermoplastic sheet of .005" to .020" thickness up to 30" wide on a repetitively uniform, high-speed production basis with a newly designed machine incorporating thermostatically controlled "instant-crease" action developed by the Sheet Plastics Equipment Division of Taber Instrument Corporation.

Dow Latex 512 is offered as an immediately available substitute for linseed and other vegetable oils.

get ready with CONE for tomorrow

In a new method of bridge building, developed at the University of Illinois, the concrete roadway is rigidly connected to the steel structure. This "composite construction" is said to save 30% in the weight of steel beams used.

be ready with CONE for today

Shell Chemical Co. has plans for the commercial production of glycerin from petroleum in 1948.

get ready with CONE for tomorrow

National Carbon Co. claims that its new flashlight cell has double the capacity of previous cells due to improved chemical mixture.

Commonwealth Edison Co. has a "cyclone" burner in its Calumet Station that removes 80% of the coal ash as molten slag in the burner.

be ready with CONE for today

Improvements and innovations in multiple spindle automatic bar machine design will be represented by the new models on display at the Cone Automatic Machine Co. booth at the Chicago Machine Tool Show.

get ready with CONE for tomorrow

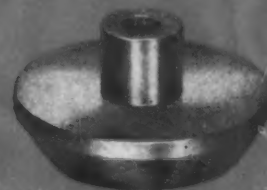
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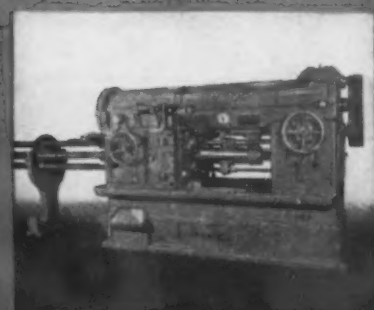
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between the two bodies it is entirely possible that the Swan Island property will remain under the control of the government until 1952 when it will be forced to withdraw according to its lease agreement and the city will be left with the bones of a cannibalized industry.

The WAA is now in receipt of a bid of \$300,000 from the California Bag & Metal Co. of this city for the ship repair yard formerly operated by Willamette Iron & Steel Co. here.

This property involves approximately 36 acres on the Willamette River and the prospective buyers intend to convert the slips to loading docks and construct a large warehouse. California Bag is presently engaged in sale of steel and salvage of nonferrous metals.

Oregon Shipbuilding Corp. shipyard here is now in the hands of WAA for disposal and it is anticipated that this property will prove to be another hot potato for the WAA to dispose of because of the involved ownership and control of several sections of the 280 acres in the yard.

Total cost of the Oregon shipbuilding yard is reported as having been \$20,673,991.

Now that the Port of Portland is

entire free of debt, having paid off its last installment of bonds this past month, the commission is looking for new worlds to conquer and is in a very satisfactory bargaining position for settlement with the WAA on the controversial matters pertaining to shipyard restoration.

LOS ANGELES—India needs U. S. machinery, structural and reinforcing steel, automobiles, tractors, trucks, electrical equipment, radios, chemical apparatus, dies, refrigerators, and all kinds of metal goods. Ending of British control of India will not seriously affect that country's position as a buyer in the world's markets since large quantities of machinery and supplies from the United States are needed in the postwar expansion of Indian industries. This was the outlook expressed by Abdul Kader, Indian industrialist and President, Chamber of Commerce of the Northwest Frontier Provinces of India.

Kader said that in raising the standards of living of his country to a level comparable to that of the western hemisphere, much will have to be imported from this country, regardless of the political division of India. The government

of India has a special program to obtain supplies from the United States. The real difficulty, apart from shortages in the United States itself, is the dollar exchange needed for payment. This problem is receiving earnest attention from the Indian government and various plans are being considered for securing the necessary dollar exchange from the sterling pool as well as to attempt to increase exports to the United States.

India's postwar expansion, he said, includes such major projects as: (1) Expansion of basic industries such as coal, iron, and power, and improvement of transportation. (2) Construction of 5000 miles of new railroads in the next 10 years, and improvement of service to lower-class passengers. (3) Immense program for construction of new highways and improvement of old ones.

Kader has been negotiating with local manufacturers of machine tool equipment, radios, chemicals, and with automobile companies for purchase of goods required by his own firm. He heads the importing and exporting firm of Kader, Siddik, Ltd., with branches throughout India.

TO SET EXPORT LIMITS: *The nonpartisan committee to determine how much we can send abroad appointed by President Truman recently, has held its first meeting. Left to right, seated: Harold G. Moulton, president of the Brookings Institution; W. Randolph Burgess, vice-chairman, National City Bank; Owen D. Young, honorary chairman, General Electric Co.; George Meany, secretary-treasurer, AFL; W. Averell Harriman, Secretary of Commerce and chairman of the committee; James B. Carey, secretary-treasurer of CIO; former Sen. Robert M. LaFollette of Wis.; and Granville Conway, president of the Cosmopolitan Shipping Co. Standing, left to right: Hiland Batcheller, president, Allegheny Ludlum Steel Corp.; Robert Koenig, president, Ayrshire Collieries Co.; Chester C. Davis, president, Federal Reserve Bank; Galvin B. Hoover, Dean of Graduate School, Duke University; John L. Collyer, president, B. F. Goodrich Co.; Edward S. Mason, Dean of School of Public Administration, Harvard University; Melville F. Coolbaugh, Golden, Colo.; and Paul G. Hoffman, president, Studebaker Corp.*



SALT LAKE CITY—Despite a wage agreement on the fringe of the nonferrous metal mining industry, negotiations between the CIO International Union of Mine, Mill & Smelter Workers and mine and smelter operators continue in a tightening stalemate. The union and the Hercules Powder Co. recently reached an accord calling for 15¢ per hr increase in basic wage rate (10¢ of which has been effective for several months), an increase of 1 and 2¢ in the shift differential and other benefits, such as a reduction in probationary period and payments by the company for certain types of work clothes.

Union negotiators were hopeful that the settlement with the powder firm would break the deadlock with the mine and smelter operators. But it apparently has had no such effect, inasmuch as the union has asked for assistance of U. S. Dept. of Labor conciliators in its negotiations with Kennecott Copper Corp. An agreement with any one of the major operators would undoubtedly bring a quick settlement in the industry generally.



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PERSONALS

• • •

• **Dr. R. C. Gibson** has been promoted from the position of director of research to that of technical director of the Parker Rust Proof Co., Detroit. **Dr. Grant C. Bailey** formerly with the research department of the Phillips Petroleum Co., has been appointed manager of the research department, and **Gaillard W. Dell**, formerly with Bohn Aluminum & Brass Co., has also joined the research staff of the Parker Rust Proof Co.

• **D. A. Griffith** has been named assistant to J. W. McMullen, general manager of Allis-Chalmers Mfg. Co.'s Pittsburgh works. Mr. Griffith has been associated with the Allis-Chalmers transformer section at the Pittsburgh plant since 1927. Prior to joining Allis-Chalmers, he was with the U. S. Bureau of Mines.

• **C. F. Mohrbacher** has been appointed assistant sales manager of the Racine, Wis. division of Twin Disc Clutch Co. **A. E. Young** has been made district manager of the West Coast territory, including California. Mr. Young has previously been in charge of the company's sales activity of the northwest territory as handled through the company's branch offices at Seattle. **E. H. Bennett** has been named district manager of the eastern territory. Formerly assistant district manager in charge of the territory served by the company's Dallas factory branch, his headquarters now will be in the company's Newark, N. J. office. **J. B. Jenkins** has been appointed district manager of the Michigan territory, with headquarters in the company's new sales office which is to be opened in Detroit on Aug. 1. **P. G. Tyrrell**, has been made assistant district manager in the territory served by the new Los Angeles office. He formerly was in the sales department of the hydraulic division at Rockford, Ill. **P. W. Wahler** is assistant district manager in the territory served by the Seattle factory branch. He was formerly in the New Orleans office.

• **J. M. Johnson**, a veteran of nearly 20 years in the electric truck field, has been appointed assistant sales manager of Automatic Transportation Co., Chicago. He was formerly in charge of sales for Automatic's transporter division.

• **David F. Scales** has been named sales manager of the direct sales division of Southern States Iron Roofing Co., Savannah, Ga. Mr. Scales had been assistant sales manager in the division.

• **Sam Norris**, since 1942 sales manager for Amperex Electronic Corp., Brooklyn, has been appointed executive vice-president.



B. E. SCHROEDER, vice-president of manufacturing, Hotpoint, Inc.

• **B. E. Schroeder** has been appointed vice-president of manufacturing, Hotpoint, Inc., Chicago. He was general superintendent of the aviation motor plant Buick Motor Co., Melrose Park, during wartime. Since then he has been engaged in production management with Buick at Flint, Mich. **Patrick W. Ryan**, for 16 years in Hotpoint plants, has been promoted to general superintendent, and **M. E. Maurer** has been promoted to general manufacturing engineer from his former work on special technical assignments.

• **Charles D. Elliott** has become associated with the Herbrand Div. of the Bingham Stamping Co., Toledo, as assistant to the manager. Mr. Elliott was formerly associated with the Federal Electric Co. of Chicago, and the Chefford Master Mfg. Co., of Fairfield, Ill.

• **T. W. Eshbach**, who has been active in the heating and ventilating business since 1923, has been appointed manager of the new Chicago office of Dravo Corp., Pittsburgh. Mr. Eshbach formerly was manager of the heating division of American Equipment Co., Chicago.

• **George T. French** has been made manager of the Union Malleable Iron Works, East Moline, Ill., replacing **Frank M. Dickey** who has been made manager of the John Deere Spreader Works, East Moline.

• **Robert W. Martindale**, Pacific Coast sales manager, **William G. Savage**, western sales manager, and **Thomas Simons**, southern sales manager of the U. S. Pipe & Foundry Co., Burlington, N. J., have retired. **A. Raymond Hausmann**, formerly assistant Pacific Coast sales manager, has been appointed Pacific Coast sales manager, and **P. King Farrington** has been made assistant Pacific Coast sales manager with offices in San Francisco. **Carl N. Brown**, formerly assistant western sales manager, has been named western sales manager with headquarters in Chicago. **J. Leslie Hart** has been appointed assistant western sales manager. **Thomas W. McCreery** has been appointed southern sales manager and **Robert C. Lemert**, assistant southern sales manager with headquarters in Birmingham. Mr. McCreery was formerly assistant southern sales manager.

• **Theodore A. Harper** has been named manager of sales for Grammer, Dempsey & Hudson, Inc., Newark, N. J. He formerly was in charge of cold finished bar sales.

• **Leonard Larson**, formerly of Adel Precision Products Corp., has been appointed sales manager of the personal airplanes division of Texas Engineering & Mfg. Co., Inc., Dallas.

• **W. A. D. Evans**, for 6 years consultant on electrical discharge lamps in administration division of the General Electric Co.'s lamp department, Cleveland, has retired after 44 years of varied experience in lamp manufacture. He completed approximately 29 years of continuous service with the company.

PERSONALS

• **W. I. Galliher** has been appointed executive sales manager of the Columbia Chemical Div. of Pittsburgh Plate Glass Co. and the Southern Alkali Corp. Southern Alkali is a subsidiary of the Pittsburgh firm. Associated with Columbia Chemical since 1931, Mr. Galliher for 12 years was director of sales for the division's heavy industrial chemical products. He has served as Columbia's executive sales manager since 1943. Mr. Galliher will maintain his headquarters at Pittsburgh.

• **F. A. McCarthy**, vice-president and sales manager of Forem Distributors, Inc., Buffalo, has been appointed dealer for industrial research apparatus manufactured by North American Philips Co., Inc., New York.

• **Alvin H. Hartman** has been appointed east coast sales engineer for the vacuum equipment division of Distillation Products, Inc., with offices in New York.

• **Robert E. Waldo**, personnel director of the Buick-Oldsmobile-Pontiac Assembly Div. of General Motors Corp. in Detroit for the last 2 years, will become assistant to F. L. Burke, vice-president in charge of the accessory group in General Motors, on Aug. 1. Mr. Waldo has been associated with General Motors since 1926. At the conclusion of the war he took over duties as personnel director of the newly-organized Buick-Oldsmobile-Pontiac Assembly Div.

• **N. K. G. Tholand** has been elected first vice-president and treasurer of the General Steel Warehouse Co., Inc., Chicago. **Y. A. Hogsten** has been elected second vice-president and assistant treasurer, and **G. J. Zimmerman** has been appointed sales manager. Mr. Tholand will continue to maintain offices in New York. Mr. Hogsten and Mr. Zimmerman have been connected with General Steel Warehouse for approximately 8 years.

• **Vivian W. Pinney** has been appointed to the home economics staff of the Crosley Div.—Avco Mfg. Corp., Cincinnati. Since 1945 Mrs. Pinney has been employed at Verkamp Corp. as home service adviser for bottled gas equipment.

• **W. Don Logan** has been appointed district manager of the Star Electric Motor Co., Cleveland. Previous to this connection he had spent 23 years with the Westinghouse Electric Corp. in Pittsburgh and Chicago.

• **Frank U. Hayes**, assistant sales manager of the Bullard Co., Bridgeport, Conn., for the past 5 years, has been named sales manager, and **E. Payson Blanchard**, sales manager, has been named director of sales.

• **Stanley Bracken**, executive vice-president of Western Electric Co., New York, has been elected president to succeed **Clarence G. Stoll** on his retirement Sept. 30. Mr. Stoll has served as president of the company since 1940 and his retirement brings to a close more than 44 years in Western Electric. Mr. Bracken brings to his new assignment more than 35 years of experience in the company's manufacturing organization.

• **R. W. Kise** has been named manager of sales of General Electric Co.'s industrial heaters and devices section, Schenectady. Mr. Kise joined General Electric in 1930. In 1940 he became a sales and application engineer in the industrial heating division, a position he held until his new assignment.

• **Thomas B. Moule**, who served as assistant director of sales in the Los Angeles office of the Plomb Tool Co. for the past 3 years, has been assigned the responsibility of supervising Plomb's expanded sales organization in the eastern half of the United States. His headquarters temporarily will be at the company's sales office at Chicago. **Jack G. Allen** has joined the Plomb sales staff to take over the duties previously handled by Mr. Moule and to supervise the export department. Previously Mr. Allen had advanced from a beginning sales position to the general managership of F. H. Noble & Co. and was on leave during the war while he served in the U. S. Army.

• **Charles F. Hintz**, sales engineer, and **Roger F. Lederer**, service, have been added to the staff of the Chicago branch of Brown Instrument Co.

• **Preston M. Postlethwaite** has been appointed manager of both electrical and automotive divisions of the Wagner Electric Corp. branch at Portland, Ore. This transfer follows his association with the sales department of the Wagner branch at Pittsburgh.

• **Sylvan Grotte** has been appointed works manager of all plants of the H. B. Salter Mfg. Co. of Marysville, Ohio. Mr. Grotte has for the past 2 years been manager of the Glauber Brass Mfg. Co. at Kinsman, Ohio, a division of the Salter Co.

• **Thomas F. Ellis**, who for many years has been in charge of tank car traffic for Shippers' Car Line Corp. and its subsidiaries, Kansas City Car Co. and Acme Tank Car Corp., has been appointed assistant vice-president of Shippers' Car Line Corp.

• **Joseph F. Chalupa** has been appointed manager of design engineering of the Westinghouse Electric Corp.'s aviation gas turbine division, Lester, Pa. He joined Westinghouse in 1930 at Philadelphia, where he was assigned to layout and design of steam turbines. In 1945 he was named section engineer in charge of the project and design section of the aviation gas turbine division.

• **Herbert W. McKeague** has been made purchasing agent and **J. Russell Todd**, assistant purchasing agent for the home radio division of the Westinghouse Electric Corp., Pittsburgh. Mr. McKeague was formerly assistant to the vice-president in the purchases and traffic division at Pittsburgh. Mr. Todd joined Westinghouse in 1941 and has had experience in the various purchasing departments.

• **H. C. McElhone** has been elected vice-president in charge of sales of the Lamb Electric Co., Kent, Ohio. Before joining Lamb Electric in 1945, Mr. McElhone was assistant to the vice-president in charge of sales of the Westinghouse Electric & Mfg. Co.

• **Henry C. Krause**, after nearly 63 consecutive years with Bausch & Lomb Optical Co., Rochester, N. Y., has retired.

PERSONALS

• **Howard W. Smith** has been appointed general manager of West Coast operations of the Cold Metal Products Co., with his headquarters at the western warehouse division, in Los Angeles. **C. N. Wrobel** has been appointed sales manager of the western warehouse division and **Frank D. Locker** has joined the sales organization there. Another new member of the western warehouse is **William F. Skeer** with headquarters in San Francisco. **Sam M. Marshall** has joined the eastern district sales organization with headquarters in the Cold Metal Products Co. sales office at New York. Mr. Marshall will cover the New England territory.

• **J. Marcus Ward** has been elected vice-president in charge of sales of the Heintz Mfg. Co., Philadelphia. Mr. Ward has been with the company for many years and was in charge of the Philadelphia sales office.

• **Elmer E. Sheldon** has been named quality control engineer of the General Electric Co.'s wire and cable division, Bridgeport, Conn. Mr. Sheldon has been with the company since 1937, when he joined the student test engineers' program at Schenectady, N. Y. One month later he was transferred to Bridgeport in test engineering for the wire and cable division and remained in that capacity until his present appointment.

• **Harold C. Weishaar**, former manager of the Milwaukee branch of the Thor Corp., has been transferred to the management of the Detroit office to succeed **Eugene Coyro**, who resigned.

• **Donald W. Larcen** has been appointed a sales engineer in the Milwaukee office of Brown Instrument Co.

• **Harold C. Clark**, former head of the road machinery division at Cleaver-Brooks Co., Milwaukee, has resigned to join the sales division of Roco Mfg. Co., Minneapolis.

• **Ralph M. Heinan**, former assistant traffic manager, has been appointed to the newly-created position of director of transportation of National Enameling & Stamping Co., Milwaukee.



WILFRED WILLIAMS, sales manager, Acklin Stamping Co.

• **Wilfred Williams** has been promoted to sales manager for the Acklin Stamping Co., Toledo. Mr. Williams had served as assistant sales manager since 1943.

• **Fred C. Bond** has been appointed technical director and **Will Mitchell, Jr.**, director of the basic industries research laboratory, at Allis-Chalmers Mfg. Co., Milwaukee. **Bruce H. Irwin** has been named assistant laboratory director and director of training for the department. Mr. Bond joined Allis-Chalmers in 1930. He has been associated with a number of important projects. He formerly was director of the basic industries laboratory. Mr. Mitchell joined the company this year after serving since 1943 as instructor at the Massachusetts Institute of Technology.

• **Stanley W. Caywood**, president of International B. F. Goodrich Co., Akron, Ohio, has resigned. He recently completed 30 years of service with B. F. Goodrich.

• **John H. Biggs**, who has been connected with the New York office of Brown & Sharpe of New York, Inc. for several years, has been appointed Rochester representative. **Earl P. Leeds**, formerly Rochester representative of Brown & Sharpe of New York, Inc., has joined the general sales staff at the Providence office of the Brown & Sharpe Mfg. Co.

• **Howard C. Wick** has been elected a director of the American Car & Foundry Co., New York. Mr. Wick has been associated with ACF for many years and has been secretary since 1916.

• **R. E. Huthsteiner**, vice-president and general manager, has been elected a director of the Cummins Engine Co., Inc., Columbus, Ind., to succeed **Hugh T. Miller**, who died May 26. **Edwin G. Crouch** was elected secretary to succeed **D. C. Bottorff**, who died June 3. **Waldo M. Harrison** was elected treasurer of the company to succeed Mr. Bottorff. Mr. Harrison also will continue as controller. **H. L. Knudsen** has resigned as vice-president of engineering. Mr. Knudsen has been associated with the company and its predecessors for more than 25 years. He will continue as a director of the company, and also will serve as engineering consultant on problems of design and research. **D. J. Cummins** has been promoted to manager of engineering and quality. He will assume most of the duties relinquished by Mr. Knudsen. **W. J. Manning** has been advanced to assistant controller.

• **Roy C. Norton, Jr.** has been appointed a field engineer in the Hartford, Conn., district office of SKF Industries, Inc., Philadelphia. **I. J. Torkelson**, field engineer, has been transferred from Chicago to the firm's branch at Milwaukee, and **R. M. Parrish** has been appointed to the sales staff of the Portland, Ore., district office.

• **Courtney Johnson** has been named assistant to president **Paul G. Hoffman** of Studebaker Corp., South Bend, Ind. Mr. Johnson will continue as assistant to the chairman of the board. He has been with Studebaker since 1939.

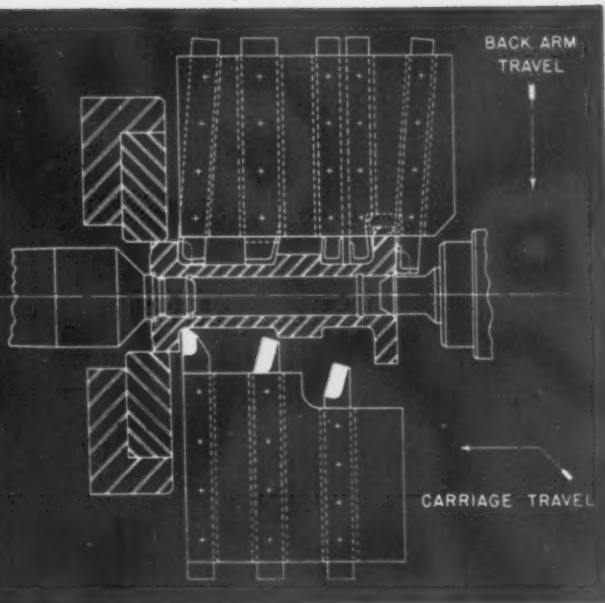
• **B. A. Case** has been appointed a member of the design engineering staff of General Electric Co.'s apparatus department, Schenectady. Mr. Case joined General Electric in 1927 on the test course. **Reginald G. Standerwick**, engineer of General Electric's aircraft gas turbine division at Lynn, Mass., has retired after 38 years of service with the company.

(CONTINUED ON PAGE 96)



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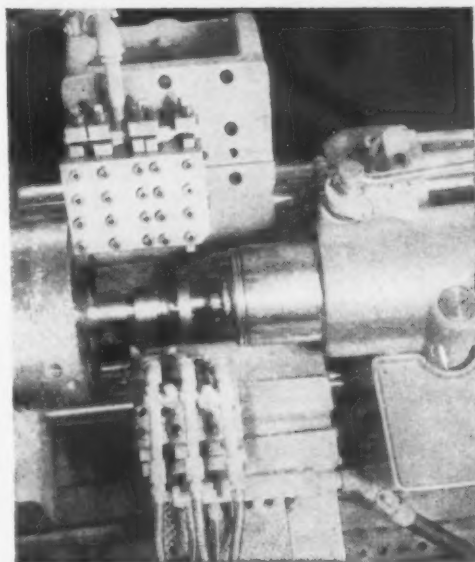
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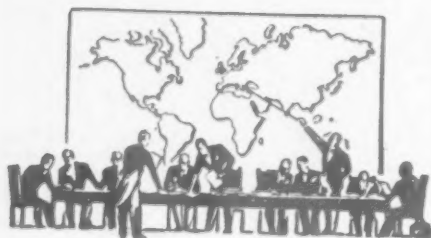
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European Letter . . .

• Britain can only benefit from American economic policy if it works, sacrifices and plans as hard as others . . . Must work its passage back to prosperity in company with 15 other nations.



LONDON—A short bout of impatience in Paris has brought Mr. Bevin diplomatic results which months of patience towards the Russians failed to achieve. Western Europe now has, after 5 days' work, what is virtually a standing economic committee for answering and briefing Mr. Marshall. Not only is Britain a member, but it is on Britain's leadership that its success largely depends. It would never have existed had not Mr. Bevin pounced on a paragraph of Mr. Marshall's Harvard speech of June 5 and hustled the European governments into conference. It will not survive unless the British interest is wholehearted and intelligent. And what that means has not yet begun to dawn on the public.

To revive a war-worn metaphor, it means that Britain has to work its passage back to prosperity through American favor, in company with 15 other nations, plus western Germany. It means that the European governments who need American aid have been marshalled into a queue in which Britain's place is uncertain. It means that the main objective of American economic policy abroad is now not to meet British needs, whether short or long term, but to promote a general European recovery from which Britain can only benefit if it works, sacrifices and plans as

hard as the French, the Dutch and the Belgians.

So before Mr. Bevin is accorded the credit he deserves for what has been achieved in Paris, these warnings should be firmly held in mind.

THE Paris conference on economic cooperation, thanks largely to British leadership and French tact, has polished off the first part of its task in a weekend. When it met recently, only 5 weeks had passed since Mr. Marshall issued his challenge to the governments of Europe to get together, take stock, present a balance sheet and offer a plan for using further American credits and aid.

Those 5 weeks have seen Mr. Molotov dismissing the American offer, also in the course of a weekend, and the governments of eastern Europe following his lead with varying degrees of reluctance. Fourteen other governments nevertheless followed the Anglo-French lead, and have left behind them in Paris a working organization of a kind which a few months ago would have seemed impracticable and inconceivable.

For such a general and willing rolling up of sleeves by the hard-pressed western Europeans there should be some reward, some payment for results. A word of appreciation from Washington, some lifting of the curtain which still surrounds the content of American economic policy, would have been timely. Instead there came the

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news that no plan to aid Europe can come before Congress until next year has begun. It almost looks as if it was haste rather than speed that Mr. Marshall wanted.

What has been achieved in this diplomatic spurt? There now exists a central coordinating committee for economic cooperation consisting of representatives of all 16 participating governments.

Under it works an executive committee of Britain, France, Italy, Norway and the Netherlands. And below that are four technical com-

mittees of experts in economic stocktaking: Their respective tasks are to study the needs and resources of member nations in food and agriculture, iron and steel, fuel and power and transport.

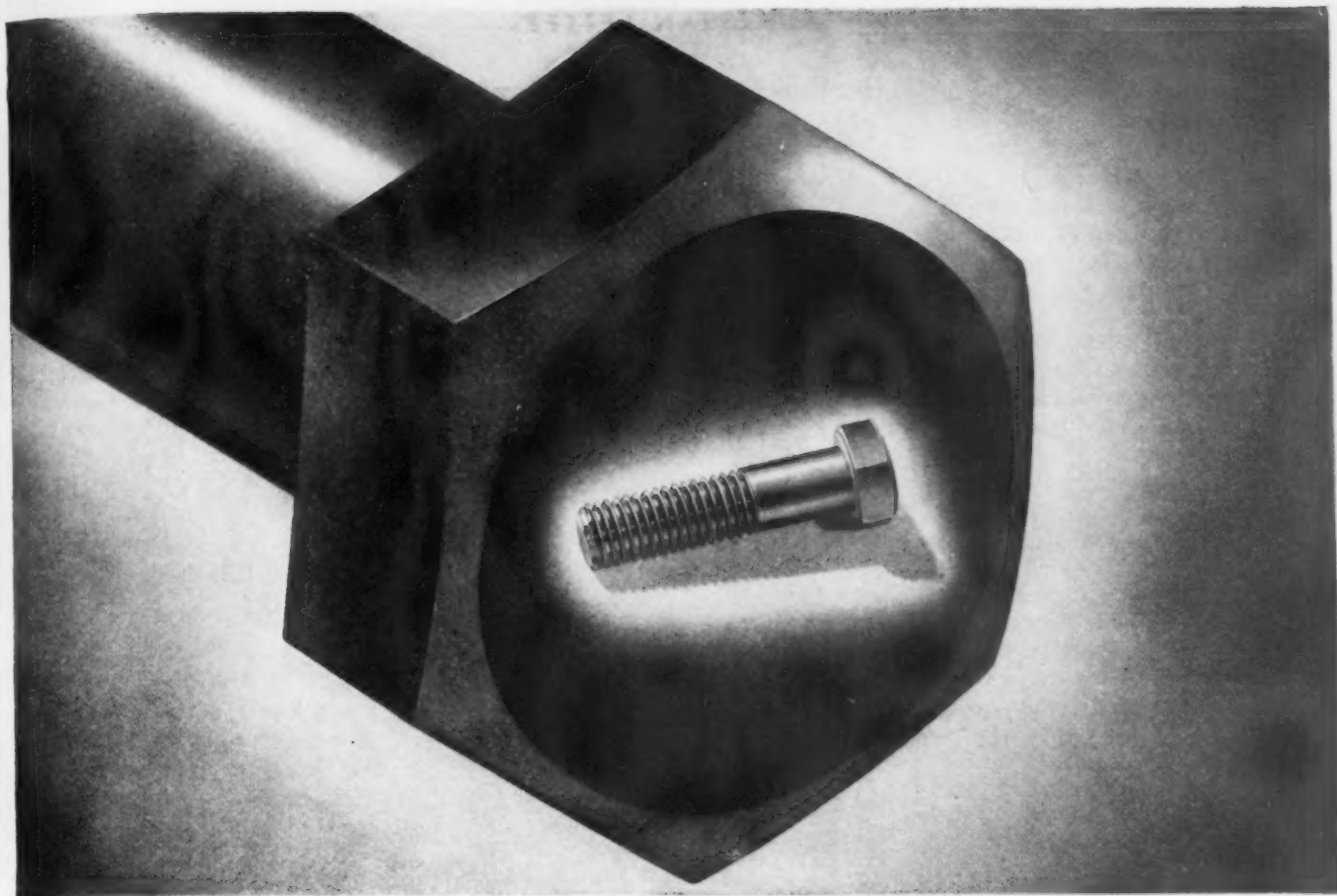
They have approximately 6 weeks in which to complete the present stage of their work, although in fact no one seriously expects the 4-year plan to reach the Americans before Oct. 1.

SO FAR so good. What hints of future difficulties have revealed themselves during the 5 days? The Scandinavian representatives insisted that the work of the conference must not lead to interference with national economic plans. That is a fair enough warning, provided that it is understood that no European plan is likely to work without modifications of some national plans, freely and willingly made.

Then the French made a very firm declaration about German recovery: "The resources of Germany should be utilized for Europe, including Germany," said Monsieur Bidault; "any other interpretation" of the idea of promoting German recovery would be "a distortion." By which Monsieur Bidault must have meant that Germany must not be given first place in the European queue. If so, that is a matter on which the conference might well adopt some vague formulas until American ideas on the precedence to be given in the queue are officially made known.

It is also clear that several delegations, among them probably the Swiss and the Swedes, want the door kept wide open for their trade with eastern Europe; they were reminded that one of the rules of the conference will be that there shall "be no restriction to the beneficial development of European trade."

Here then are some signs of future difficulty: Reluctance to modify national plans and agreements to fit into a larger scheme; anxiety that the recovery of Germany should not get out of hand or take undue precedence over that of dev-



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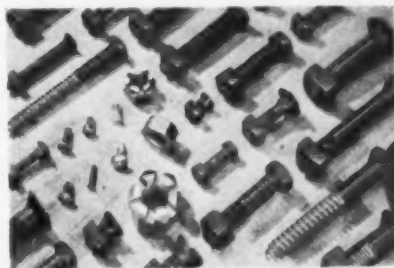
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THE COMPLETE
QUALITY LINE



astated nations; determination not to jeopardize existing political and economic relations with eastern Europe and Russia.

These symptoms are not at this stage alarming; they should remain harmless enough so long as the conference concentrates on stock-taking. But once the attempt at planning begins they will become serious, unless the 16 governments decide very soon what concessions each will make to maintain effective cooperation.

TAKEN all in all, the achievement of Paris is impressive. The 16 governments which contributed to it represent a greater concentration of economic strength than is generally realized. Between them they accounted before the war for nearly three quarters of the imports and exports of Europe, excluding Russia. They contain 212 million inhabitants, among them the most highly-skilled and best-educated workers of Europe. Five of them have great colonial possessions with over 237 million inhabitants (excluding India) and command immense raw material resources.

Politically, they are mostly old friends and allies, agreed on most major issues. If they can also agree on an economic plan and stick to it, their joint power of negotiation should be considerable. Shy though they are of all talk of closer association, they should sooner or later make it clear that they will negotiate for American aid as one body.

If Washington's recent attitude to London is any guide, the Americans will not like to see individual governments leaving the queue to make known their special needs and proposals behind the counter.

The future prospects of these European planners will clearly depend very much on the leadership they are given. If Paris and London do not continue to work closely together and fail to agree—for example on policy towards Germany—the pressure of Russian diplomacy may well detach some of the more timid and cautious governments.

And if there is any suspicion that the British government thinks of stretching one hand towards America in the European plan and another in separate British overtures, then the newly kindled flame of mutual trust will flicker out.

In other words, the major American contribution to Britain's dollar needs will have to be sought in the joint European reply to the Marshall offer; which means that the "twelfth hour" of which Mr. Morrison spoke recently will strike before any Marshall Plan is known in detail.

Mr. Morrison said the hour would strike "in the autumn;" and it is now known that Congress will not begin to act until the winter. If this is the only prospect ahead—and the American reactions to Mr. Morrison's speech suggest strongly that it is—the British public should be at once informed and made to understand the serious implications.

Does it mean that no further American aid can be expected before the spring, and then only as part of a European plan involving modifications of our own economic policy? Or is it hoped that the presentations of a convincing and workable program between now and Oct. 1 may be sufficient to tempt American bankers to extend indirect aid to Britain, for example by special measures to feed and equip the Ruhr and western Germany generally? If that is the hope, what sacrifices will the British people be called on to bear in case the European plan proves unacceptable, either to Mr. Marshall or to Congress? What precisely are the stakes in the gamble?

THESE questions demand serious public discussion, with facts given in more detail and prospects more clearly drawn than they were in the recent speeches of Mr. Dalton and Mr. Morrison. There is a grave risk of the Marshall Plan becoming for the British public a phrase as dangerous and debilitating as was collective security in the 'thirties—an anodyne that is taken for granted before it even exists.

Indeed the risk is twofold; not only is the phrase being used to cover a shiftless, mendicant attitude of mind, but Mr. Marshall's initiative is being applauded without any thought of the sacrifices which may be involved in accepting it. For it is inescapable that the consultations of the next few months, which the Paris conference is now preparing, will bring to light in Europe striking dis-

crepancies in standards of living, productivity, equipment and efficiency.

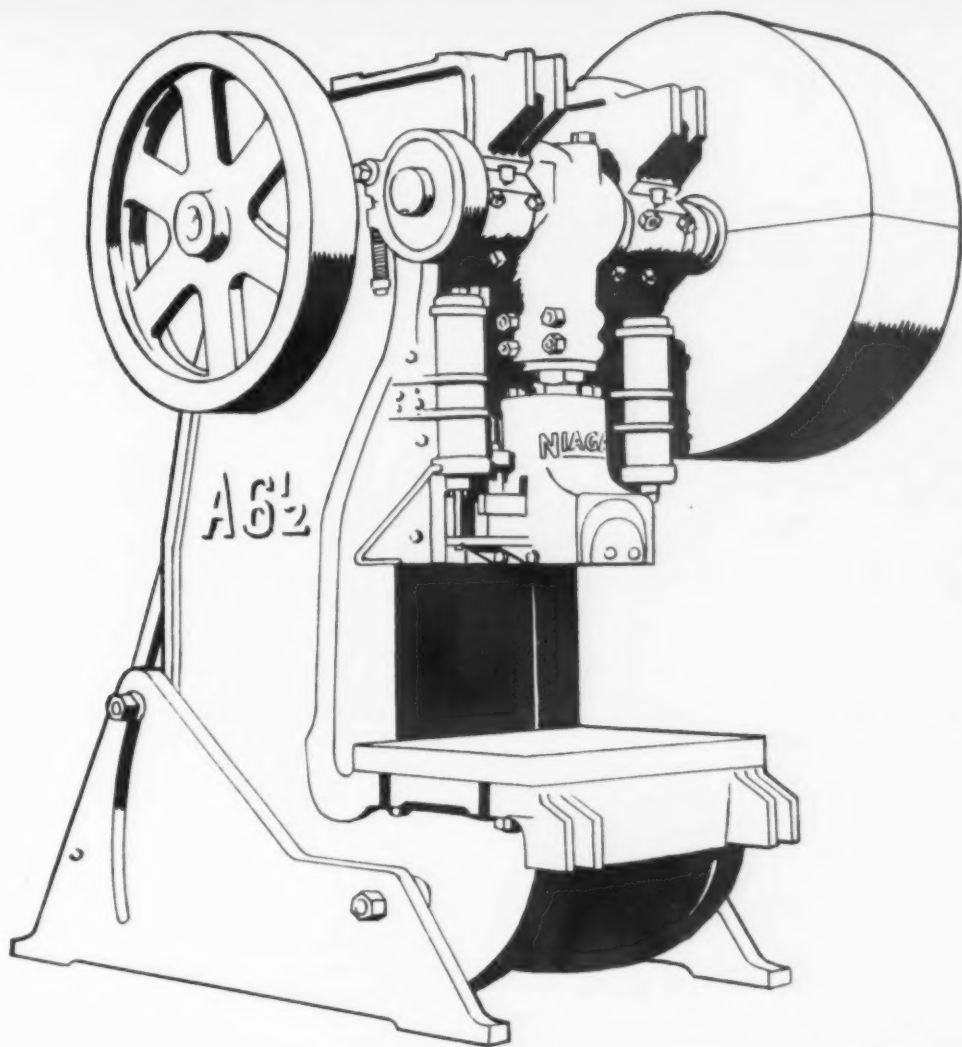
The French worker, for example, accepts the 48-hour week as part of his national plan; the British worker does not. German workers in the Ruhr need houses far more urgently than British workers; the Danes need cattle cake even more than the British farmers; Belgian and French miners work harder than British miners and could stake prior claims on any European stocks of steel, timber and equipment.

There is no reason to believe that any of these points would become major controversial issues; but it is important to understand that these discrepancies exist, that the men who will prepare the Marshall Plan are aware of them, and that the doctrines of equality which the British government so assiduously practice at home are likely to be applied by the United States in any new economic assistance for western Europe.

It will now be tempting for the Foreign Secretary to rest for the moment on some well-earned laurels, to point to the Paris conference as a success for British diplomacy and to draw what conclusions he wishes from the fact that a major European meeting has been held without the Russians.

But, for better or for worse, he has now hitched the economic hopes and plans of the Cabinet to a European movement; and that movement was started by an American Secretary of State answerable to Congressmen who are hard-hearted judges of the British Socialist experiment.

If the British public are not told—and Mr. Bevin is the man to do it—why they have been booked to work their passage towards better times with 15 allies and former enemies, they will learn the reasons from American voices. For a fortnight past these voices have been developing the theme that beggars cannot be choosers and must work hard to live; and they will not be silent until British statesmen take courage at the twelfth hour to explain just what sacrifices and changes in British policy are needed even to keep a place in the European queue.



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Industrial News Summary...

- **Steel Prices Up \$5.90 a Ton**
- **Annual Cost \$350-370 Million**
- **Scrap Prices Continue to Climb**

ON AN annual basis steel consumers will pay an additional \$350 to \$370 million because of the steel price increases put into effect last week and this week. THE IRON AGE weighted finished steel composite price this week is up \$5.90 a ton. A straight average of the increases would be higher than this but THE IRON AGE figure gives weight to the actual shipments of the various products involved in the series.

The stiff advances made in all major products which ran from \$5 to \$10 a ton will without doubt substantially cover increased costs brought about by the steel labor contract, the coal wage agreement and part of the higher scrap costs. On a percentage basis the average steel boost takes the steel price level to 37 pct above the average prevailing in 1939. During that year steel prices had been driven to rock bottom because of a rugged price war among steel firms. The actual increase in prices since prewar days appears to be somewhat less than the higher levels reached on many other commodities.

Steel wages in 1939 averaged 84.2¢ an hr and the current labor rate is estimated at around 1.56¢ an hr, an increase of 85 pct over the 1939 level. Scrap prices today average \$40.83 a gross ton compared with \$16.39 for the year 1939 or an increase of 149 pct. It is expected, however, that the current high level of scrap prices will not be maintained throughout the year.

WITH the current steel price advances effective immediately on all shipments, third quarter earnings for the steel industry as a whole should approximate first quarter records—among the highest in steel industry history. This excellent condition however will not be continued if steel demand, now strong, should slide off in 1948. There is little chance, however, of any substantial drop in steel industry activity throughout the remainder of this year.

In the face of rising steel prices, scrap markets throughout the country showed no tendency to back down this week. THE IRON AGE steel scrap composite again made a new record this week when it went to \$40.83 per gross ton, up 83¢ over last week's level. No. 1 heavy melting advanced \$1.50 a ton at Pittsburgh, \$1 at Philadelphia and \$3.50 at Detroit. But the biggest boosts came at Youngstown, up \$5 a ton, and at Cleveland, \$4.25 a ton.

In Boston brokers were paying \$2.25 a ton more than last week while at New York the increase was \$1.50.

Steel ingot output this week rose a half point to 94.5 pct with most districts back to their previous record levels. There is now every indication that output of steel in 1947 will approach the all-time war boom year of 1944 when 89 million tons were turned out.

STEEL consumers, because of the high steel price increase, will be forced to make major revisions in prices of their finished products. Since the steel advance plus overhead will be passed on to the ultimate consumer, prices on practically all items using steel will soon be higher. Detroit experts figure the increase to automobile makers will be about \$13 per car. Farm implement manufacturers who recently reduced prices on many items expect to restore these cuts and may even have to advance quotations beyond the old figures. A few smaller steel companies in the Midwest who had been quoting firm quarterly prices will have to absorb some of the loss until present commitments are completed.

Since the steel price became effective immediately there was nothing to be gained by steel consumers in piling in steel orders. Order volume this past week was substantial and exceeded the current output by a wide margin on some products. Under the surface there were indications that some large consumers have deferred orders for a month or two. It is also expected that deliveries will become easier as the steel industry completes its commitments on material for freight cars. Shutdowns in the automobile industry have forced some cutbacks in orders by automobile makers but this is expected to be a temporary situation. Considerable activity on balancing inventories has been in evidence during the past few weeks.

Large manufacturing companies who have elected to enter into conversion deals whereby they supply the ingots and a steel company finishes them are getting more than their fill as the price of scrap soars. The ingots purchased by automotive and other manufacturers for conversion are predicated on the current price of steel scrap. Furthermore, the substantial increase in conversion deals has left a bad taste and in some instances has aided and abetted the gray market in steel. The report persists that one large automobile company has ordered an end to all conversion deals after the third quarter.

STEEL warehouses, when they digest current steel price changes will as quickly as possible establish new price lists. All of the raises are expected to be passed on to the consumers. This week or next, makers of low alloy high strength steel are expected to advance their prices around \$10 a ton average.

Along with the base price changes all major companies added 5¢ per 100 lb to the pickling charge on hot-rolled sheets. There were some reports early this week that final plate price adjustments would include extra changes. There were also rumblings from some producers who felt hot-rolled bars should have advanced \$8 per ton instead of \$6 and galvanized sheets \$12 a ton instead of \$8.

• **LAST MINUTE**—Industrial legislation passed in the closing hours of Congress last week and due to be acted upon by the President this week includes the Premium Price Plan Act, providing \$70 million for premium payments over a 2-year period on copper, lead, zinc and manganese; the Knutson Bill to continue suspension of tariff duties on ferrous and nonferrous scrap imports until June 30, 1948, and the Military Establishments Appropriation Bill, which includes an appropriation of \$25 million for movement of Army-generated scrap back to the United States. Legislation on repealing the wartime suspension of antitrust prosecution for industries cooperating among themselves and extending the life of the Senate Small Business Committee, now investigating the steel shortage, until Apr. 1, 1948, was also enacted by Congress.

• **REPUBLIC ACQUIRES**—Republic Steel Corp. has acquired government-owned facilities at Warren and Youngstown, according to officials of the War Assets Administration. At Warren, Republic bought the byproducts coke oven plant for \$3,864,000, and leased the property in Youngstown for 10 years. The Warren facility includes about 17 acres of land, 61 Wilputte coke ovens, pusher machine, quenching car and locomotive, byproducts and purification equipment, sulphate equipment and sintering plant complete. The plant has a rated capacity of 392,000 tons of sintered concentrates and 325,000 tons of coke per year. Republic leased the Youngstown property, which covers 6 acres and includes a blast furnace with a rated capacity of 392,000 net tons of pig iron a year, a power plant and other facilities.

• **CONSTRUCTION INDEX**—Although output of 7 items was higher in May than in April, the Commerce Dept. composite index on production of 19 significant construction materials declined nearly a half point for the month. Many of the declines were in metal items, including fabricated structural steel (down 10.2), wire nails and staples (down 10.0), and cast iron pipe and fittings (down 8.4). On the other hand, production of rigid steel conduit was up 9.4 points and cast iron radiation showed no change.

• **GEAR SALES**—The Gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows a decrease in volume of sales for June 1947, as compared with May 1947, of 11.4 pct. This report does not include turbine or propulsion gearing. The index figure for June 1947 was 343.

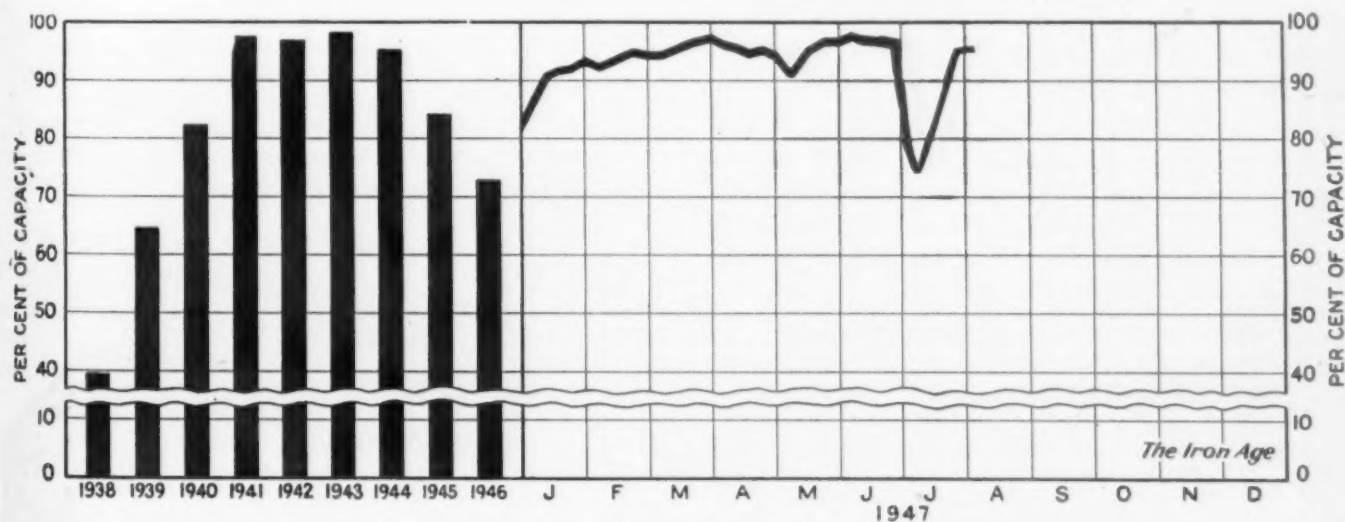
• **CANADIAN WIRE NAILS**—Production of iron and steel wire nails in Canada during May totaled 6669 tons, an increase of 60 tons over the preceding months, but 61 tons below output for May last year. During the first 5 months this year production of nails totaled 32,135 tons against 30,545 tons in the corresponding period last year. Output of steel wire during May jumped to 27,602 tons from 24,282 tons in May last year. For May production included 20,661 tons of plain wire, 5677 tons of galvanized wire and 903 tons of barbed wire. For the first 5 months this year production of wire totaled 135,526 tons compared with 115,680 tons for the same period last year.

• **CLEVELAND EMPLOYMENT**—Employment in the Cleveland area reached 585,500 at mid-year, almost 25 pct above the 1940 level, according to the Ohio State Employment Service. OSES reported that the figure was also a 4 pct increase over the level of a year ago despite the fact that job opportunities, as indicated in OSES files are dropping off. OSES also reported a surplus of applicants for the following jobs: bench assemblers, precision grinders, engine lathe operators, toolmakers, spot welders, shaper operators. There are still job openings for floor assemblers, mill operators, die setters, sheet metal workers, draftsmen and power brake operators.

• **BLAST FURNACE TAKEN OUT**—Republic Steel Corp. has announced that the No. 2 blast furnace in Gadsden, Ala., is being taken out of blast because of poor condition. This furnace, built for the Defense Plant Corp., has been operated by Republic for the government since 1942. It has been producing pig iron for the Federal Housing Administration during recent months.

• **U. S. STEEL EARNINGS**—U. S. Steel in the second quarter of this year showed an income of \$29,336,868 compared with \$39,234,511 in the first quarter. Earnings per share in the second quarter were \$2.65. Earnings per share for the first 6 months of 1947 were \$6.43. Steel ingot operations in the second quarter were 98.1 pct of capacity. The second quarter earnings were after a special and extra deduction for depreciation of \$6,700,000. Shipments in the second quarter were 5,288,716 net tons. Shipments in the first 6 months were 10,132,390 tons.

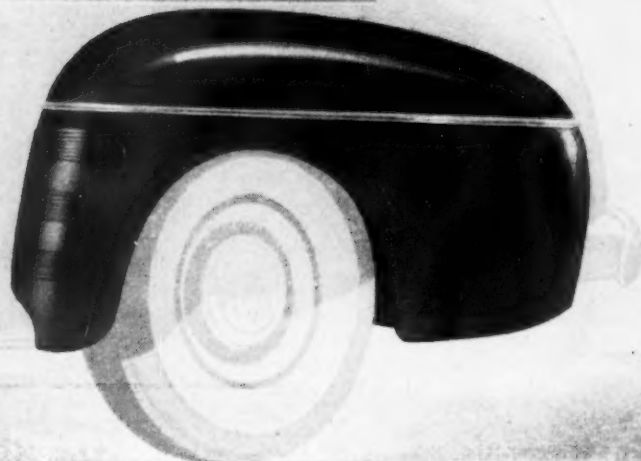
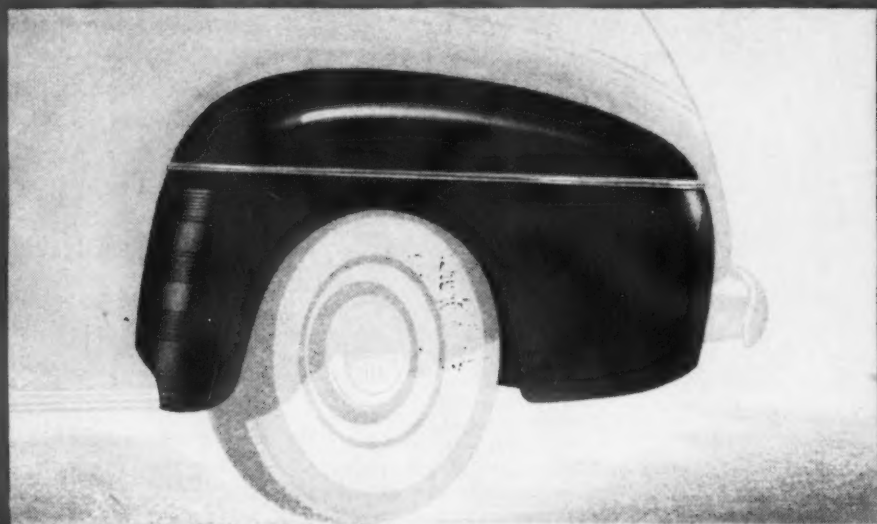
Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 22	101.5	95.0	89.0	95.0	95.0*	102.0	85.0	99.0	101.0	99.0	98.5	84.5	94.0	94.0
July 29	102.0	95.0	90.0	95.0	97.0	102.0	90.0	99.0	101.0	105.5	97.0	84.5	94.0	94.5

* Revised.

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Steel Base Prices Advance an Average of \$5.90 per Ton

New York

• • • With the majority of steel companies having posted new prices, and U. S. Steel and Bethlehem expected to follow suit this week, the average price of steel to the consumer this week is up \$5.90 a ton. Since this is a preliminary figure based on THE IRON AGE weighted composite finished steel price, a revision may send it higher next week. Individual increases range from \$5 to \$8 a ton. Some products early this week had not been raised yet.

The stiff increase in steel prices puts them about 37 pct above the average for 1939. The increase over a week ago amounts to about 13 pct. The following major changes were made by leading producers: \$6 a ton on hot-rolled sheet and strip; \$7 a ton on cold-rolled sheet and strip; \$8 on galvanized sheets; \$8 on enameling sheets; \$7 on hot-rolled pickled and oiled; and \$6 on carbon steel plates and structurals.

Hot-rolled carbon bars were advanced \$6 a ton, cold-drawn carbon bars \$7 a ton, alloy hot-rolled bars \$5, alloy cold-drawn bars \$6, wire rods \$6., bright nails \$10, galvanized nails \$5, bright wire \$5, and merchant wire \$5 a ton. Concrete reinforcing bars were included in the \$6 advance put into effect for hot-rolled bars.

While all producers have not yet announced prices, some have advanced butt-weld standard pipe an average of \$7 a ton on black pipe and \$10 a ton on galvanized pipe. Lap-weld standard pipe is up on the average \$8 a ton on black and \$11 on galvanized. Seamless standard pipe was advanced the same as butt-weld standard and the markup on extra strong merchant pipe was the same as for standard pipe. Line pipe has been advanced \$7 a ton and oil casing, drill pipe and oil tubing have been marked up on an average of \$7 to \$8 a ton.

The increases put into effect late last week and early this week are the first advances made in the industry since the last week in December 1946 and the first week in January this year. At that time

Higher Steelmaking Costs Are Cited as Quotations Rise By \$5 to \$10 a Ton

By TOM CAMPBELL
News-Markets Editor

the average increase in base prices was about \$3.60 a ton. However, revisions in extras were made with the result that the average cost to the consumer was from \$5 to \$6 a ton higher.

In March 1946 when wages went up 18½¢ an hr and when the industry was under OPA control the government sanctioned an increase averaging \$5 a ton. Later this increase was allocated to various steel

products. Subsequently labor costs rose and mills were forced to pay higher prices for raw materials.

The price advance made this week according to most companies was due to a combination of steel labor cost advances, higher coal labor costs and increases in scrap, fuel oil and cost of replacing steel-making equipment. E. T. Weir, board chairman of National Steel Corp., stated that steelmaking costs have advanced \$12 a ton since the first quarter of the year. He broke these costs into: Scrap \$4, labor \$4, coal \$1, fuel oil \$1, miscellaneous material \$1, and depreciation \$1.

While some sources had looked for an increase of from \$2 to \$3 a ton as late as last week, THE IRON AGE 3 weeks ago estimated that the average price increase would run to \$5 to a ton. Preliminary figures show that the average boost weighted by the percentage of total shipments for each product will work out around \$5.90 a ton. Tin mill products were not advanced by any producer for the simple reason that the major portion of this output is sold on a yearly basis. Contracts are signed at the beginning of the year.

This is the second time in the past year or so that the can companies have been able to maintain their tinplate and blackplate prices on the basis of their annual contract. In March 1946 an attempt to raise tinplate \$5 a ton failed because of the major contracts which were signed previous to Jan 1, 1946 between can companies and leading steel companies. However, last December tinplate was advanced \$15 a ton. If market conditions warrant, tinplate prices may be advanced late this year.

Steel consumers not looking for such substantial advances in basic steel prices will be forced to raise prices on their finished products. It is a general rule among steel fabricators that the base price of the steel product used is a component part of the finished price formula. On the basis of current production this week's steel price boost will add about \$350 million a year to the initial steel consumers' bill.

Vital Statistics

New York

• • • According to THE IRON AGE weighted finished steel price composite, the increases made in steel products this week take the price level 37 pct above the average of 1939. This is a conservative boost compared to price advances in other products. In 1939 the steel price index of 2.31088¢ a lb reflected rock bottom after a rugged price war which had broken out in the latter part of 1938.

The average steel labor rate in 1939 was 84.2¢ an hr. This week the steel labor rate is estimated at \$1.56 per hr, or an increase of about 85 pct since 1939. When later figures are in, average hourly wage rates are expected to be higher.

The average price of heavy melting steel scrap at Pittsburgh, Chicago and Philadelphia for the year 1939 was \$16.39 per gross ton. This week the composite was \$40.83 a gross ton. This represents an advance of 149 pct over the 1939 figure. Scrap prices are expected to go higher but before the year is out they may level off to a lower figure.

Higher Pig Iron And Coke Prices Affect Nonintegrated Mills

Philadelphia

••• The shortages of pig iron and coke are so severe in eastern Pennsylvania, and the price of scrap is so high, that some blast furnace producers have been required to work out novel pricing arrangements with their customers. Some consumers have adopted the practice of phoning all distributors of pig iron and coke in eastern Pennsylvania as often as every week even though the probability of obtaining any significant tonnage is remote. Occasionally a small tonnage of off-grade iron can be bought through such contracts. Foundry executives have recently begun making personal visits to pig iron and coke suppliers.

Consumers of basic pig iron from the Swedeland plant of Alan Wood Steel Co. are paying a price adjusted to the equivalent of the

current market price for heavy melting scrap in Philadelphia. This arrangement was worked out with customers to permit supplying them with pig iron without a loss to the producer who could otherwise make use of its own basic pig iron production in the open hearth.

Recently E. & G. Brooke Iron Co. at Birdsboro, Pa., was required to increase its pig iron prices by \$6 a ton largely because of the higher costs involved in switching from the use of by-product coke to beehive coke when its coke supplier became unable to continue as its source of supply.

In view of the current pig iron market, producers have been selling on the basis of price f.o.b. furnace. Current prices of basic and No. 2 foundry pig iron delivered Philadelphia, as quoted by THE IRON AGE, represent average prices of these grades from Birdsboro, Swedeland and Bethlehem, plus freight charges to Philadelphia.

366,124, compared to \$3,156,544 during the second quarter of 1946.

Mansfield, Ohio

••• Record earnings for first half of 1947 have been reported by Empire Steel Corp. Net profit for the first 6 months of this year amounted to \$645,115, equal to \$5.47 per share on 117,919 shares of common stock outstanding. This compares with earnings of \$4.26 per share on the same number of shares outstanding for the entire year 1946.

Warren, Ohio

••• Thomas Steel Co. has reported net profit for the 6 months ended June 30 increased to \$1,041,969 from \$388,667 in the first half of last year. Net is equal to \$2.97 a share on 336,140 shares of common stock compared with \$10.02 a share on 338,300 common shares a year ago.

New York

••• The Barium Steel Corp. reports net earnings for the 6 months ended June 30, of \$789,123, equal to 40¢ a share on the outstanding capital stock. For the first 6 months of 1946 Barium showed a loss of \$82,132 for the consolidated operations.

Aluminum Co. Reports Part Completion Of Improvement Program

Pittsburgh

••• A progress report on the Aluminum Co. of America's improvement and modernization program, designed to increase the company's manufacturing and mill capacities by about 20 pct, indicates that the program is about one fifth completed.

At present construction rates, the new Davenport, Iowa, sheet mill will be ready for operation early in 1948, and the Hillside, Ill., diecasting plant will go into operation near the turn of the year. The reequipment program of the foundry at Bridgeport, Conn., for the manufacture of aluminum permanent mold and sand-castings will be completed by the end of 1947. Likewise, improvements in the aluminum foundries at Cleveland, Garwood, N. J., and Detroit, should be completed about the same time.

No indication was made of the operating date of the additional foil rolling equipment at the Alcoa Edgewater, N. J., and Alcoa, Tenn., plants, but since these are equipment rather than construction installations, late 1947 or early 1948 should see production at these points.

In addition to the construction and reequipment projects, the company is rehabilitating the extrusion plant at Cressona, Pa., that was purchased from War Assets Administration. The purchase of a plant at Richmond, Ind., resulted in the removal from New Kensington, Pa., of the Aluminum Seal Co. This move should be completed by Aug. 1, 1947.

To Build New Furnace

Pittsburgh

••• A new bloom heating furnace with a capacity of 100 tons an hr will be constructed for Spang-Chalfant Div., of the National Supply Co. at Ambridge, Pa., by Rust Furnace Co., Pittsburgh.

The furnace, one of the largest ever to be built for a tube mill, will have an effective heating length of 97 ft. It will be triple-fired, zone controlled, end charged and end discharged.

Steel Firms Give First Half Earnings Reports

Cleveland

••• Republic Steel Corp. reported consolidated net income for the second quarter of 1947 of \$5,214,820, after all charges, including a provision for federal income taxes of \$3,775,000. This compared with first quarter earnings of \$11,516,795, a decrease of nearly 55 pct.

Second quarter earnings are at the rate of 84¢ per share of common stock and amount to approximately 3 pct on the sales of the quarter. Earnings for the second quarter of 1946 were \$4,802,756 or at the rate of 78¢ per common share.

Middletown, Ohio

••• American Rolling Mill Co. earned \$6,312,104 in the second quarter of 1947 and \$12,230,981 for the first 6 months. In 1946 the comparable figures were \$5,218,129 and \$7,022,616.

Pittsburgh

••• Jones & Laughlin Steel Corp. reported first half 1947 earnings of \$11,703,156 against \$3,156,544 in the first half of 1946. Second quarter earnings were \$5,-

Sees Foreman's Assn. of America Hanging on the Ropes

Detroit

••• Having lost its Ford strike on every count, including the firing of 32 of its members for alleged violence, the Foreman's Assn. of America is hanging on the ropes. Unless FAA is unexpectedly successful in tying up with CIO or AFL most sources here believe this independent foreman's organization will be officially counted out.

Meanwhile, the auto industry is taking active steps to draw its foremen toward management. Ford has ambitious plans in this direction. GM will continue to follow its well defined and smoothly working policy with respect to foremen and their relation to management. A new deal for foremen at Packard is expected after Aug. 23 when foremen will no longer have any standing in federal court as a bargaining agency.

It is generally agreed that the rise of the foremen's union didn't just happen. In the opinion of most observers the wage stabilization law that froze foremen's wages at inequitable levels was the largest single factor in promoting the growth of foremen's unions. Other contributing factors were labor contracts that permitted the bypassing of foremen, fear of cut-backs in personnel during reconversion and plain neglect on the part of management.

At the moment the GM foreman's program that resisted successfully all attempts of FAA to unionize GM plants seems to be the pattern that most auto producers are likely to follow. It has also been suggested that some plants may attempt to establish something resembling a company union for foremen. The program that will be followed at Ford Motor Co. will undoubtedly have many policies in common with the present GM plan. Incidentally, the Ford foreman's program will be directed by a former GM labor relations expert.

Less than 2 months ago FAA was claiming 30,000 members and its leaders were predicting that the organization would have more than a million members by the end of 1948. Then came the ill-advised 47-day walkout at Ford that is estimated to have cost foremen at the Rouge, Highland Park and Lincoln

Auto Industry Preparing To Bring Its Foremen Toward Management

• • •

By WALTER G. PATTON
Detroit Regional Editor

• • •

plants \$2 million in lost wages. Except for a 10 pct increase in salary granted to all Ford salaried employees, the Ford foremen got nothing from the strike.

The Ford strike was called when FAA demanded a new contract calling for check-off of union dues and promotions based on seniority. Ford was unwilling to grant what it described as an extension in the union contract. The final Ford offer, rejected by FAA, was to renew the previous contract.

In calling a strike FAA was obviously counting heavily on shutting down Ford operations. Despite the absence of approximately 3800 foremen Ford kept its operations practically on schedule. In some departments it is reported that production during the strike actually exceeded the prestrike output. During the strike, UAW-CIO and AFL members crossed FAA picket lines. A UAW-CIO last-minute offer to mediate the dispute was rejected by Ford.

With the passage of the Taft-Hartley bill FAA lost the second round of its 1947 fight for recognition. While the union promises a stiff court battle to test the new law the fact that it has lost its best customer—Ford, that its funds are running very low and that Detroit foremen generally have little stomach left for strikes after the

A Fresh Start



Ford fiasco are expected to operate strongly against the union.

In addition to ill-advised leadership and a weak legal and financial position, the industrial conditions that gave original impetus to foremen organization have now largely disappeared.

In a recent memorandum to FAA Ford charged that the foremen "were rapidly becoming a less rather than more effective part of management." The company insisted that all recent union demands were designed to strengthen the association but none were designed to improve the status of the individual foreman. Ford also charged the union had conducted a campaign of terror during the strike in which hundreds of workers were beaten, some in their homes. "Clubs, knives, even guns were used by association goon squads," Ford asserted.

Meanwhile Ford kept in close touch with its foremen by means of personal letters from Henry Ford II. Many foremen, it is claimed, appealed to the company in person or by telephone. The company noted carefully that a back-to-work movement was gaining strength and gave this movement encouragement. Last week the foremen voted 10 to 1 to return to their jobs.

Under the Taft-Hartley act, after Aug. 23 employers will have no legal obligation to bargain with foremen's unions. Some legal advisers have interpreted the law to mean that employers have the right to fire foremen for union activities although it is expected that this part of the law will require interpretation in the courts.

Early in its fight for recognition, FAA learned that GM foremen were "a hard nut to crack." The union was never successful in organizing GM foremen, primarily it is believed because GM acted early to improve the position of its foremen.

As early as 1940 GM put all of its foremen on a 125 pct salary formula. Foremen were carefully classified in their jobs. Rights and duties of foremen were clearly defined by management.

For years GM has insisted upon writing into its contracts with the union a clause that does not permit bypassing the foremen's authority over his men.

GM also offers its foremen insurance, sick leave, special parking privileges and in many plants spe-

cial locker rooms and dining rooms are provided. In its contracts with the union, GM insists that its foremen must be given an opportunity to settle grievances at the foreman level. Foremen are given severance pay; they can hire and fire for cause according to a GM spokesman; they can also recommend transfers.

Another factor that is believed to have contributed to the success of the GM foreman program is that GM has no shop stewards but operates on a committeeman system in which each committeeman represents a specified number of hourly workers. According to GM officials this setup has been successful in eliminating clashes between foremen and shop stewards who may

Pressure Removed

Detroit

• • • Much of the steam behind the FAA threat to retaliate against Ford for discharging 32 FAA members for violence was removed when the union met recently and union leaders themselves recommended that strike action be postponed. Out of 3800 Ford foremen, the union estimates 400 attended the meeting. Other sources report attendance was nearer 200.

The union has denied that the discharged men were given individual hearings as claimed by Ford. At the meeting, Robert H. Keys, national FAA president, told the men to go back to work and lay plans for a strike that will knock out the Ford Motor Co. Another meeting is scheduled for Aug. 3.

represent the same department in the plant.

There are no "straw bosses" in GM plants. An intensive foreman training program has been carried on continuously since 1930. In the new Chevrolet assembly plant at Flint, foremen have a small desk and a name plate on which the foreman's name appears in gold letters.

In the Slichter report to the War Labor Board in 1945 the panel found that fear of layoffs or demotions resulting from transfers was the greatest worry of the foreman. The panel also recommended the setting up of satisfactory machinery for handling minor grievances which it felt might be the cause of serious discontent. Opportunity for freer exchange of viewpoints with

higher management was also recommended by the panel. A comparison of the Slichter report with published policy of GM with respect to foremen indicates that the corporation had already taken most of the steps recommended by the committee.

The Ford foreman relations program got under way this week when management sent two communications to the home of each Ford foreman. Ford plans to mail these "news letters" periodically to all supervision to keep the employees informed as to company, decisions, plans and policies.

The first letter advised foremen they were to take their vacations within the next 60 days so the company would be "ready to swing into its new model changeover program."

The second letter explained that although salaried personnel would not be required to ring time clocks after July 31, the new procedure in no way affected payment for overtime.

While the idea of an independent foremen's union may be a dead issue in the auto industry, the idea of developing a sound program to bring foremen closer to management appears to be just beginning. Many interesting developments in this field are expected in Detroit, particularly as new interpretations of the Taft-Hartley law are issued by the courts.

Japanese Pig Iron And Steel Output Reported Going Up

Washington

• • • Due largely to improvement in the fuel and power situation, March production by Japanese heavy industries showed a general gain with pig iron and steel ingots spearheading the increases, according to the April report by Gen. Douglas MacArthur.

Production in these two lines is now at about 60 pct of the minimum monthly output needed during 1947 for rehabilitation of railroads, mines and other industrial facilities, MacArthur reported. Output of light metals such as copper, lead, and zinc also increased.

Japanese coal production during March rose by some 10 pct above the February output.

See Improved Steel Deliveries If Present Trend Continues

Chicago

•••Prospects of much better steel deliveries in the immediate future will become a reality if the present trend continues, competent authorities believe. Bonus tonnages, first noted in *THE IRON AGE*, May 8, 1947, p. 127, are increasing in certain products from a scattered number of mills. Cancellations of steel orders, although increasing, have not been great. But deferred delivery requests have jumped considerably in the past 30 days. The steel delivery situation now varies widely according to product.

Most metal consumers have not yet benefitted from the better position of the mills, as much of the extra tonnages have been shipped to the railroad car builders. Observers here declare that by August the mills will have more than satisfied this demand, and that the producers will then offer the trade tonnages over and above the standard quotas.

Observers here point to the steel industry's performance on the railroad freight car program as indicative of that industry's ability to produce. During the month of June and in many cases into July, the steel producers overshipped the promised tonnages of all products to the railroad builders. In cases certain mills overshipped from between 25 to 50 pct depending on the particular item. Independent experts here claim that this effort on the mills' part is not without a motive.

Should the freight car building program not reach 10,000 units a month by August, it is believed that the government will take very drastic action. August is named as the day of judgment as authoritative traffic men declare that the freight car shortage will reach an all time peak late in the month. By supplying more than enough steel to the car builders, the producers can establish irrefutable evidence that the car shortage is in no way attributable to the lack of steel.

A large purchaser of steel for the freight car building program, when questioned on deliveries, substantiated the fact that open

Industry's Action on Freight Car Program Indicates Productive Ability

By D. I. BROWN
Chicago Regional Editor

space over and above his allocated requirements has lately been offered. In this case, at least two suppliers offered plates and shapes for early July or early August. He volunteered his private opinion that the steel producers prompt supply of steel to the car builders, without allegedly cutting other quotas, was not entirely unforeseen by the producers as far back as the March meeting on freight cars in Washington. Later experiences prompted him to hazard a guess, that even those who foresaw the present conditions then, underestimated the degree of slack that has occurred in products other than sheets.

Exact steel delivery conditions for the past year have been more or less guarded. Because of the unprecedented demand from all quarters, producers have been hesitant in admitting any easing in the supply of the products they make. Consumers, also, have generally not been inclined to fully admit the progressive improvement in stocks on hand since the first of the year. In cases, consumers have continued to accept delivery of certain items rather than cancel the unneeded tonnage for fear their suppliers will be less attentive in shipping other items which are still in short supply, or that they will lose their position on the mills books. The experience of carrying large unbalanced inventories has been as new to many consumers as it has been unpleasant to all. The result has been that steel users in the past weeks have adopted a more realistic policy.

Many metals consumers are now moving back delivery dates of material on order under the regular quotas, and occasionally ask for

outright cancellation. This trend started in the East and moved west from Philadelphia early in June. By the third week in June the Pittsburgh and Cleveland areas had noticed the increase in deferred delivery requests. As yet the Chicago area has not been greatly affected. Steel executives state that this trend follows a historic pattern.

Mills in the East are reported willing to accept a straight deferment. Of the two mills in Chicago which so far have been asked to defer tonnages, the practice has been that the producer cancels the tonnage as the bookkeeping in deferred requests could become too cumbersome. So far tonnages so cancelled for a given quarter can not again be added to the regular quota if the customer decides he can use the steel at a later date.

One mill in the East has adopted a standard questionnaire which is applied to customers wanting to defer deliveries. July vacations in consumer plants are a factor, but steel officials in the East say as yet they are not satisfied that either vacations or worry over inventories is the whole answer.

Some of the deferred tonnages have been shoved back as far as September and with the exception of sheets and small carbon rods, all products have been noticeably affected. The five different mill offices contacted in Chicago report this experience in various ways. One mill stated the condition did not exist. One blames deferments on vacations in consumer plants. One mill declares deferments were due solely to unbalanced inventories and the condition is temporary. Two mills "off the record" substantiated the opinion of independent observers, with the exception that deferments might not be as heavy on the midwest mills as it could be in the East.

One steel sales executive pointed out that eastern mills, which have pulled out of the midwest and are selling close to home, will naturally cause deliveries to improve in that area first. He further told *THE IRON AGE* that although his

(CONTINUED ON PAGE 102)

Personals . . .

(CONTINUED FROM PAGE 82)

• **James R. Darnell** has joined the Bjorksten Research Laboratories of Chicago, in the capacity of assistant to the president. Mr. Darnell was formerly employed as a chemist by the Corn Products Refining Co. and the Pure Oil Co.

• **Wilber F. Pray** has been appointed New York district manager of Askania Regulator Co., Chicago. Mr. Pray has been associated with Askania since the inception of the company.

• **Robert O. Bullard** has been appointed manager of the metallurgy division of General Electric Co.'s chemical department. Mr. Bullard has been engineering and manufacturing manager of the metallurgy division since last November. He came with General Electric in 1930.

• **Sidney H. Rogovin** has been named general sales manager of Tracy Mfg. Co., Pittsburgh. Until recently regional sales manager for Admiral Corp., Mr. Rogovin was formerly appliance sales manager for Stewart-Warner Corp.

• **J. C. Frantz** has been named director of sales research for the Apex Electrical Mfg. Co., Cleveland. Prior to joining Apex Mr. Frantz was with the Bayless-Kerr Co., Cleveland, as an industrial account executive and assistant production manager.

• **G. R. Stewart** and **C. P. Ebert** have joined the National Cylinder Gas Co., Chicago, as a member of the executive staff and director of purchasing, respectively. Mr. Stewart was formerly account executive of Young & Rubicam. Mr. Ebert comes to the company from the Chicago district purchasing department of the Carnegie-Illinois Steel Corp.

• **W. F. Rochow** has been appointed to the position of assistant to the president, Harbison-Walker Refractories Co., Pittsburgh. In his new position, Mr. Rochow will be in charge of the research and sales technical departments. Mr. Rochow has been with Harbison-Walker since 1912.

• **H. W. Anderson**, president and general manager of the Fidelity Machine Co. for the past 22 years, has been elected vice-president and a director of H. Brinton Co., Philadelphia.

• **Norman F. Pinnow** has been appointed chief engineer of the Henney Motor Co., Freeport, Ill. He has been associated with the company for several years.

• **H. L. Pigott** has been promoted to general passenger agent of Wabash R.R. Co., with headquarters at Detroit. **James E. Dooley** has been appointed assistant general freight agent with offices in the Wabash passenger station, Decatur, Ill.

• **Dr. R. M. Hitchens** has been appointed research director of the Monsanto Chemical Co.'s organic chemicals division, St. Louis. Dr. Hitchens, who has served as associate director since 1944, succeeds **Dr. Lucas P. Kyrides**, who recently resigned. **Dr. O. J. Wein-kauff**, assistant director, has been promoted to associate director, and **Dr. F. B. Zienty** and **Dr. L. L. Fellingner**, group leaders, have been promoted to assistant directors.

• **Donald S. Zern** has been appointed general sales manager of E. J. Cady & Co., Chicago.

• **Robert Price** has been appointed manager of the development department for the plastics division of the B. F. Goodrich Co. and will have charge of all technical work at the new plant at Marietta, Ohio. Mr. Price has been with the company since 1938. For the last 2 years he has been manager of technical service and development in the plastics division at the company's Akron plant.

OBITUARY...

• **Chester J. Boon**, 58, sales manager of the American Steel & Wire Co., Cleveland, for more than 15 years, died recently. Mr. Boon had been associated with the Wire company for 37 years both in Cincinnati and Chicago.

• **Wilson A. Fenn**, 61, president of the Fenn Mfg. Co., Hartford, Conn., died recently. He was also treasurer and a director of the Fenn company.

• **William L. Maxson**, 49, president of the W. L. Maxson Corp., New York, died July 14.

• **Robert M. Gantert**, 52, a pioneer and oldest in years employed of the sales force of Island Equipment Corp., New York, died recently.

• **Frederic S. Wilhoit**, 72, former purchasing agent for Cutler-Hammer, Inc., Milwaukee, and who was with the firm 41 years, died July 11 from a heart attack.

Coming Events

Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.

Sept. 1-4 American Society of Mechanical Engineers, fall meeting, Salt Lake City.

Sept. 8-12 Instrument Society of America, conference, Chicago.

Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Dodge-Chicago Plant, Chicago.

Sept. 18-20 Foundry Equipment Manufacturers Assn., annual meeting, Hot Springs, Va.

Sept. 22-25 Assn. of Iron & Steel Engineers, annual meeting, Pittsburgh.

Sept. 29-Oct. 3 American Gas Assn., San Francisco.

Oct. 2-3 Gray Iron Founders' Society, annual convention, Milwaukee.

Oct. 6-7 Packaging Machinery Manufacturers Institute, annual meeting, Springfield.

Oct. 9-10 Porcelain Enamel Institute, annual meeting, Cleveland.

Oct. 16-17 National Conference on Industrial Hydraulics (formerly Hydraulics Machinery Conference), annual meeting, Chicago.

Oct. 18-24 National Metal Exposition, Chicago.

Oct. 30-Nov. 1 American Society of Tool Engineers, semiannual meeting, Boston.

Oct. 31 Illinois Mining Institute, annual meeting, Springfield, Ill.

Nov. 7-8 Annual Conference on X-Ray and Electron Diffraction, Mellon Institute of Industrial Research, Pittsburgh.

Weekly Gallup Polls . . .

Marshall Plan Finds Wide Support Among U. S. Voters

Princeton, N J.

•••The first nationwide sounding on public opinion on the Marshall Plan reveals that a large majority of voters who have heard or read about the plan approve it. There is a willingness to see the United States spend large sums of money to carry it out, according to George Gallup, director, American Institute of Public Opinion.

The groups in the population who are best informed about the plan are the most in favor of it.

Those facts are shown in a coast-to-coast institute survey. Parallel surveys just completed in two representative nations in Europe, France and Holland, by overseas affiliates find that public sentiment there is overwhelmingly in favor of the Marshall Plan, and that the French and Dutch people are better informed about the plan than are voters in this country. To them, of course, the proposal offers a way out of acute economic hardships.

American public opinion on the Marshall Plan is being closely watched by leaders here and abroad. The fate of millions of people in Europe may depend on how we react to the plan and whether American opinion will approve the spending of billions of dollars for the plan when the showdown comes in Congress.

The survey reveals these five salient points about public reaction to date:

1. About half the voters (49 pct) polled say they have heard or read about the Marshall Plan, which Secretary of State George C. Marshall first outlined thoroughly in June in a speech at Harvard University. The plan is an invitation to European nations to get together and determine the needs of all the countries on the continent. Secretary Marshall stated that this country would then see what it could do to provide funds for economic recovery on the basis of a total European balance sheet rather than by piecemeal dealings with each country as at present.

The proportion familiar with the plan will presumably increase as news and discussion about it continues.

2. The majority of voters who have heard about the plan indicate support of the idea of giving European countries credit of about \$5 billion annually to buy things they need in this country.

The \$5 billion figure is one of the general estimates given in informal discussions recently as to what the Marshall proposal might cost. The exact figure is not yet known.

3. While sentiment toward the plan is favorable, this does not mean that there will not be a big fight if the plan is going to require raising money by extra taxation.

Public support for the plan would decline sharply if taxes had to go up to support it. Fewer than half the voters familiar with the plan would be willing to pay such extra taxes, today's survey finds. In short, public support of the plan so far is conditioned largely on its being paid for out of current government revenues.

4. The survey brings to light the fact that understanding of the plan and support for it are lowest among voters with the least education and those in the lower economic levels. Of people with only a grade school education or no schooling who have heard of the plan, fewer than half favor it, as compared to two out of every three persons who have had college training. A similar split has been found in other surveys involving the issue of aid to Europe, notably in the case of the British loan last year.

In short, the people whose tax payments are largest on a per capita basis and who would therefore personally contribute the most under the Marshall Plan are the most in favor of it. Those on whom the burden would fall least show the greatest opposition.

5. The State Dept. decision to go ahead with the plan despite Russia's refusal to cooperate struck a responsive chord in American opinion. Of those who

Annual Credits of \$5 Billion
Endorsed by Public Provided No
New Taxes Are Required Here

o o o

have heard about the plan, an overwhelming proportion, eight out of every ten, said that European nations should go ahead without Russia.

Public opinion on the historic Marshall Plan was sounded in a series of questions designed to measure attitudes both quantitatively and qualitatively. The questions sought to bring out what people know about the subject, what their general attitudes are, how they react to specific proposals, and how much economic sacrifice they are willing to see this country make to aid Europe.

The questions and the replies of the voters are as follows:

"Have you heard or read about the Marshall Plan for helping Europe get back on its feet,"

	Pct
Yes	49
No	51

Among voters who have had college training seven in every ten had heard about the plan, as compared to five in ten among people with high school training only, and about four in ten among those with grade school or no schooling.

All who have heard about the plan were asked the following questions:

"What is your opinion of the plan?"

	Pct
Approve	57
Disapprove	21
No opinion	22

By education levels the vote was:

	College Pct	High School Pct	Grade School or No School Pct
Approve	67	55	49
Disapprove	17	22	27
No opinion	16	23	24

(CONTINUED ON PAGE 124)

Shortage Inquiry Expected to Air Steel Capacity Controversy

Washington

• • • Congressional inquiry into steel shortages, now due for early postadjournment study of producers' problems, is expected to bring forth industry's answers to government proposals for expansion of steel capacity as well as possible government operation.

Although Senator Murray, D., Mont., decided in the closing days of the recently-ended session not to introduce his proposed bill providing for government aid to producing mills, he intends to introduce a similar measure early in January, when the second session of the 80th Congress is due to convene.

Invitations have been sent from Senator Martin, R., Pa., chairman of the steel subcommittee of the Senate Small Business Committee, to representatives of 11 large producing mills. Senator Martin plans to reopen the hearings early in August along these lines: "Gentlemen, here are the complaints made to us by end-users and small consumers of steel. Most of them agree that the root of the shortage problem lies with the producers. Now, what are you going to do about it?"

Senator Murray's proposal (THE IRON AGE, June 26, p. 100) calls for a government study of capacity needed for so-called full employment and subsequent aid, through the Reconstruction Finance Corp., to finance expansion. New producing facilities would be set up by the government, under the Murray

Senator Murray Intends To Introduce Government Aid Bill for Steel

• • •

proposal, if such need is indicated in the government survey. Senator Murray's suggestion is closely akin to that presented to the committee last week by Walter Reuther, president of CIO United Auto Workers.

Mr. Reuther bases his argument on what he calls the industry's "program of planned scarcity." Failure to expand steelmaking capacity in the next few years will result in widespread unemployment by 1950, he says, and will so weaken the U. S. economy that the nation may be lost to Communism "by default." Voluntary allocation now on the part of the industry will go a long way toward increasing supplies for the automobile industry and other basic consumers of steel, he feels.

"UAW believes that private industry should not be allowed to jeopardize the future of the country," Mr. Reuther told Senator Martin's subcommittee. "The government, if necessary, should see to it that the necessary capital is made available for expansion of the steel industry."

Summing up his proposals for government operation, Mr. Reuther states: "If the steel industry cannot, or will not, equip itself to

produce the steel required for full employment, then the government must be prepared to see that the steel is produced. If the steel industry finds that the risk of making an investment in full employment is too great, the public will find that the risk of repeated booms and busts and millions of workers thrown out of their jobs is a risk that's too great to take. They will insist that their government take the risk in making steel so that the nation can protect itself from the greater risk of economic breakdown."

Frank R. Nichols, president of the Nichols Wire & Steel Co., of Davenport, Iowa, told the committee last week that there is some feeling among end-users in the industry for contributing to a fund to publicize "the evils that cause the steel shortage and the black market." At least one friend in the business, he said, has indicated willingness to contribute to such a fund and has indicated that from \$50,000 to \$100,000 "could be raised without any difficulty." Even granting that there is a worldwide shortage of steel, Mr. Nichols believes "the mills can, to a great extent, improve the situation." Industry's own controls, he says, "would alleviate many critical shortages."

Voluntary control certainly won't be easy to accomplish, Mr. Nichols admits, but he believes the effort to accomplish it should be made. The ICC, he points out, is an example of the inevitability of government control over basic industries which cannot or will not control themselves in the public interest. Mr. Nichols recalls the statement of Fowler Hamilton, former special assistant to the Attorney General: "Private property only passes into public hands when it fails to serve the public interest."

Freight Hearings Set

Washington

• • • The Interstate Commerce Commission has set September 9 as the date for opening hearings on the recent railway petition for nationwide freight rate increases averaging 16 pct.



CONTINUES
FIGHT: Frank R. Nichols, president of the Nichols Wire & Steel Company of Davenport, Iowa, testified before the Senate Committee on the steel shortage. He says other small producers are afraid to speak out.

• • •

Export Tinplate Allocations Set 2000 Tons Above Third Quarter

Washington

••• Fourth quarter export allocations of tinplate by countries reveals that Australia will receive the largest amount, a total of 12,800 tons; Brazil and the Netherlands will receive the next largest amounts, 10,500 and 9500 tons, respectively.

The fourth quarter allocation totals 142,000 tons and represents an increase of 2000 tons over third quarter allocations. Of the total, 120,000 tons will be used for packaging abroad of perishable food products for which supply assistance will be made available through the OIT by the use of the symbol CXS on validated export licenses.

An unrated allocation of 22,000 tons will also be available for which no supply assistance will be granted by OIT. This allocation may be used only for packaging materials abroad for importation into the United States or for packaging of oil products by petroleum companies operating abroad.

The Latin American countries have been allocated 31,151 tons; Europe, 42,925 tons, and the rest of the world, 36,210 tons. On a percentage basis, this division of tonnage and the allocations to individual countries are approximately the same as in previous quarters, OIT said.

In addition to the 35,151 tons allocated to Latin American countries, 5100 tons have been assigned to Argentina, Brazil, Uruguay and Paraguay, for the British meat pack, as has been the practice in previous quarterly allocations.

A breakdown of the rated fourth quarter tinplate allocation by countries follows:

Latin America		Quota Short Tons
Argentina	.....	9,000
Bolivia	.....	200
Brazil	.....	10,500
Chile	.....	3,000
Colombia	.....	800
Costa Rica	.....	23
Cuba	.....	3,750
Dominican Republic	.....	100
Ecuador	.....	65
Guatemala	.....	50
Haiti	.....	23
Honduras	.....	20
Mexico	.....	4,250

Nicaragua	.....	30
Panama	.....	50
Paraguay	.....	165
Peru	.....	900
El Salvador	.....	25
Uruguay	.....	1,400
Venezuela	.....	800
Total	.....	35,151
Meat Pack	.....	5,100

Europe		
France	.....	6,300
Belgium	.....	6,500
Denmark	.....	1,000
Norway	.....	6,000
Netherlands	.....	9,500
Italy	.....	3,500
Portugal	.....	2,500
Sweden	.....	3,100
Switzerland	.....	3,100
Finland	.....	250
Rumania	.....	25

Eire	.....	400
Greece	.....	750
Total	.....	42,925

Other		
Australia	.....	12,800
New Zealand	.....	3,400
South Africa	.....	6,000
Middle East	.....	1,150
Turkey	.....	800
Philippines	.....	1,200
French North Africa	.....	3,200
China	.....	1,500
Madagascar	.....	650
Newfoundland	.....	100
India	.....	1,500
Malaya (Straits Settlements)	.....	490
Indo-China (French)	.....	350
New Caledonia	.....	50
Iceland	.....	250
French West Africa	.....	200
Netherlands East Indies	.....	1,575
Hong Kong	.....	250
Portuguese West Africa	.....	180
Portuguese East Africa	.....	65
Belgian Congo	.....	250
Martinique-Guadeloupe	.....	50
Southern Rhodesia	.....	250
Total	.....	36,210
Contingency	.....	614
Total	.....	120,000

Apex Plans Expansion With Current Profits

Cleveland

••• Net sales of \$8,601,146 for the second quarter and profits, after taxes, of \$672,476 have been reported by Apex Electrical Mfg. Co.

Sales for the 6-month period ended June 30 were \$15,753,367, with profits of \$935,654 after federal taxes, which includes nonrecurring income of \$189,685 after federal taxes arising from settlement of a war claim. Net is equal to \$2.70 per share on the 340,000 shares outstanding.

Principal physical expansion took

place in the Apex Co.'s Sandusky, Ohio plant, where enlargements made it possible for the company to quadruple production of vacuum cleaners and to overcome the bottleneck in electric motors by producing its own, in quantity sufficient for most of its needs.

Based on business now on the books, Apex is scheduling operations for the last half of the year on the same level as the first. With working capital increased to \$5,147,719, as a result of current profits and completion of a 15-year term loan of \$2,500,000, substantial expenditures are planned which include an addition to the Cleveland plant for the production of its new automatic washer.

W. A. Barber Dies

••• William A. Barber, 63, treasurer, Chilton Co., Philadelphia, publishers of THE IRON AGE and other business papers, died at his home on July 20, in Bala-Cynwyd, Pa.

Mr. Barber, a native of Onarga, Ill., was formerly professor of economics at New York University, from which he was graduated.

He was also an executive of Lee Higginson Corp., New York City, dealers in securities, before joining the Chilton Co., in 1932.

Mrs. Barber and two daughters, Mrs. Huntington B. Crouse, and Mrs. Isabelle Githler, survive.



Cost Reductions Needed to Bar Additional Price Increases

Pittsburgh

••• The need for greater economy is facing industry today as never before. Cost reductions between periods of peak activity during the past 35 years have been favorable to enterprise, but they have grown progressively smaller. It appears that the point of diminishing return in cost reductions through product design and actual production is approaching, barring some revolutionary discovery.

The cost problem has become extremely acute since the end of the war. Industry is fighting rising costs that tend, in the long run, to price products out of the market. The alternative is to lose money and no manufacturer can do that for long. Metal producers

Labor Charge Increases Have Counterbalanced Savings Otherwise Effected

as well as fabricators face the same problem. Steel producers are experimenting with new iron and steel furnace designs incorporating the use of oxygen in firing in order to speed up heats and bring up the yield per man-hr of work.

The machine tool industry did a momentous job during the war in speeding up metal fabricating. The development to its present technique of the transfer type machine is typical of this industry's contribution. Currently, the experiments on vibratory tooling

seems important. The current demand for better steel conditioning and faster hot and cold materials handling methods has broken the ground for developments in this field.

The changes during recent years in the proportion of factory costs spent for labor, materials and general factory expenses indicate the potential economies in materials will be less significant than

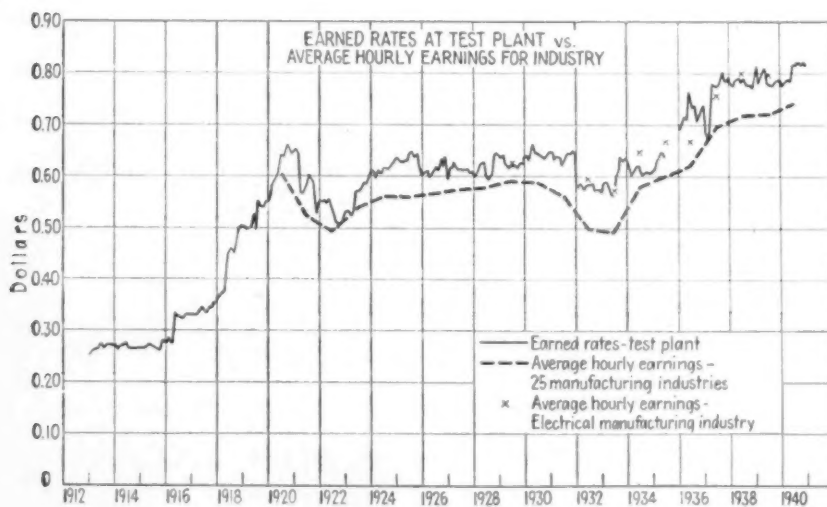


FIG. 1

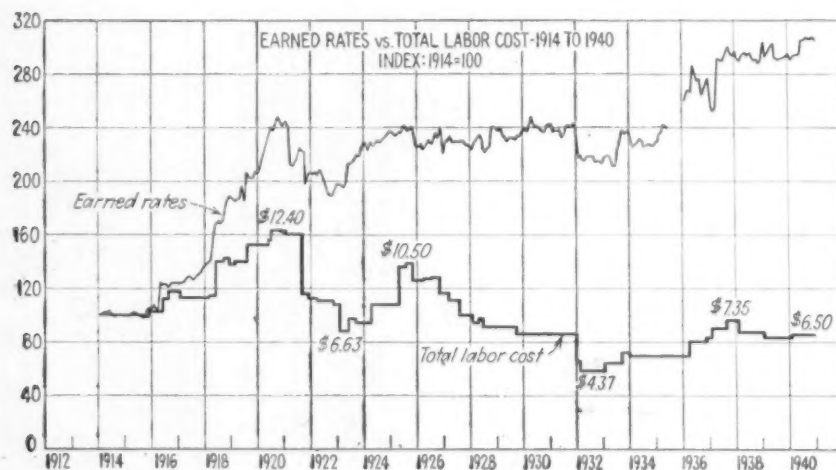


FIG. 3

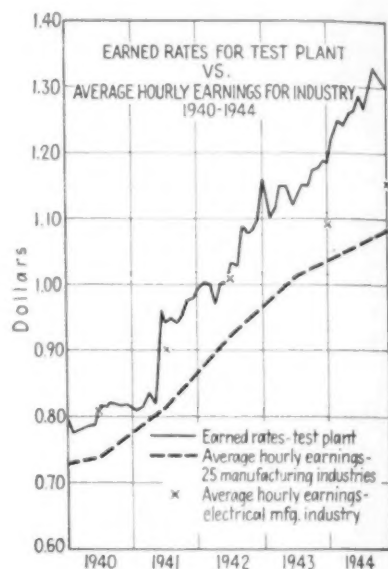


FIG. 2

during the 1920-1930 period. Economies in labor and general factory expenses will be more important. Major economies, however, will have to come from material handling and from alterations in present distribution and sales methods.

The changes that have occurred in the past 30 years in the major elements of costs of a specific standard product have been examined carefully to develop illustrations of changes that were more general. One company has made a study of a standard product which it has been producing for the past 30 years.

Despite the intervention during the 1914-1944 period of two world wars, a sharp inflationary period and a deep depression, only the earned rates paid to workers show any substantial net change during that period. The average

earned rate of hourly employees at the test plant, including overtime premiums, at the end of 1940 was three times what it was in 1914, rising from 26.5¢ an hr to 80.3¢ an hr. By the end of 1944, rates rose to \$1.279 an hr and the rise continued into early 1945 reaching \$1.332 an hr in February. This was about five times the 1914 figure.

The major factors involved in the increase during the 1940-1945 period were, in their approximate order of importance, overtime premium pay for longer work weeks, two general rate increases, and the upgrading of individual employees. Earned rates at the

test plant from 1914-1944 are shown in figs. 1 and 2, along with the average hourly earnings in 25 manufacturing industries and in the electrical manufacturing industry.

It might be presumed that labor costs at the test plant had risen substantially over the 30 year period. Instead, they were 14 pct lower in 1940 than in 1914. As shown in figs. 3 and 4, the gap between earned rates and labor cost per unit has widened consistently since 1916. Labor costs have risen from time to time concurrently with sharp increases in wage rates, but each rise has been followed by a decline in labor cost when earned rates levelled off.

The steadily widening gap between the trend of labor cost per unit and the trend in earned rates can be ascribed to: (1) Continued progress in engineering and design of product. (2) Continued

progress in manufacturing processes and techniques. (3) Substantially larger volume of sales and production. Thus, labor affects labor cost per unit only indirectly under the incentive system in effect at the plant, as it facilitates development of more efficient production techniques. While further progress along these lines will be made, these advances must at some point become less significant, since they cannot be expected, for example, to reduce labor cost per unit to zero. However, since neither current conditions nor the record of the past 30 years provides much prospect of a lasting reduction in basic wage rates, emphasis in future efforts at cost reduction will have to fall elsewhere.

Material costs, on the other hand, have dropped despite increases in the cost per lb of material. Material costs per lb of

(CONTINUED ON PAGE 118)

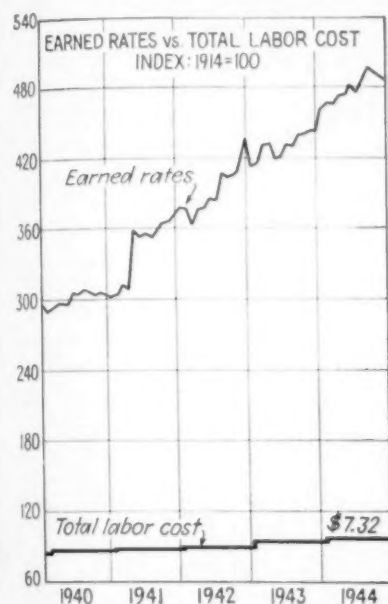


FIG. 4

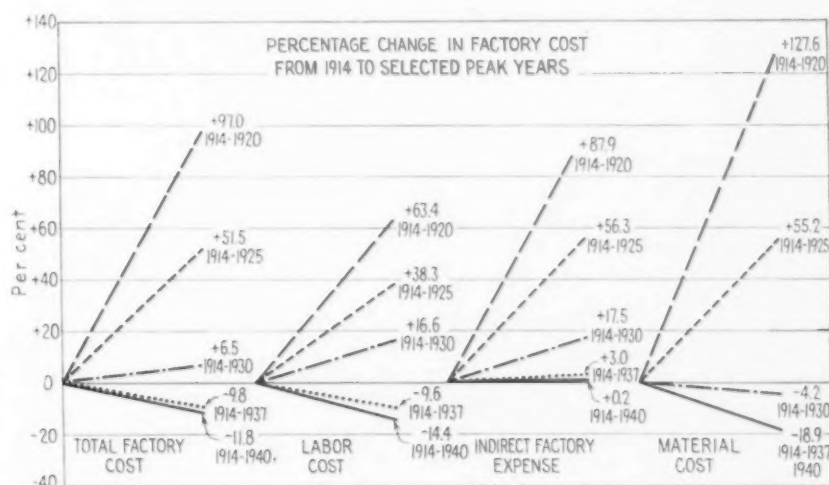


FIG. 5

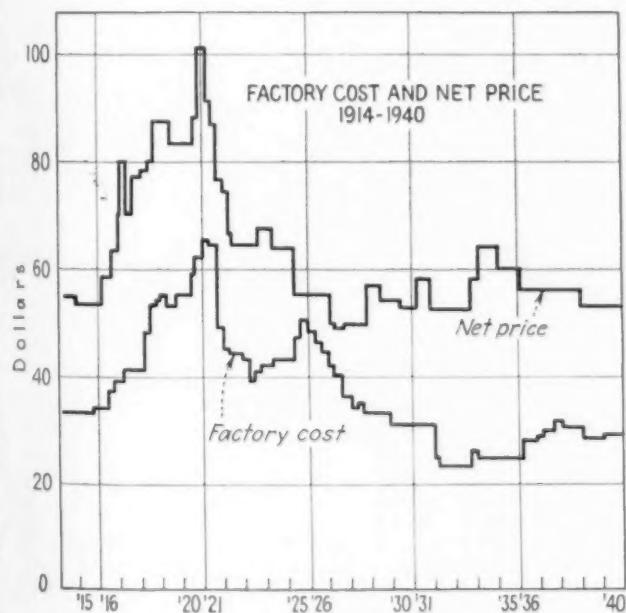


FIG. 6

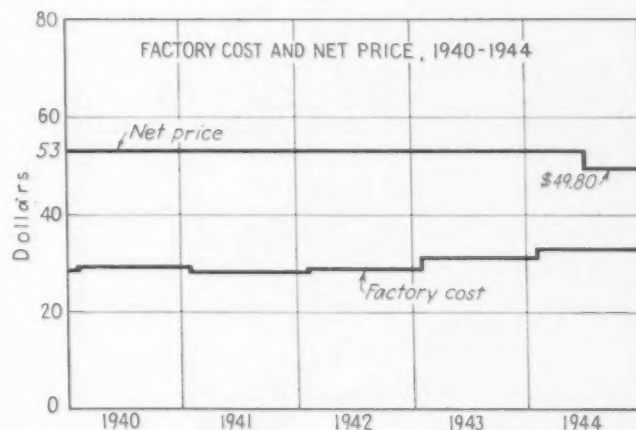


FIG. 7

Industrial Briefs

• **NEW ORGANIZATION** — David F. Sklar has formed the Kent Cliff Laboratories, Peekskill, N. Y. This organization is available for consultation, development and the manufacture of hardness testing equipment and associated apparatus.

• **METAL MOLD COATING**—The E-Z Coat Diecoating Co. has been formed for the development and sales of die coatings for permanent molds and ladles. Harold E. Bourassa is president. The company, which will also offer an engineering service in connection with permanent mold problems, is located at 44 Coolidge Rd., Chicopee, Mass.

• **MANUFACTURER'S AGENTS** — Formation of a new firm of manufacturer's agents covering the state of Ohio, the Industrial Products Sales Co., 1659 W. Market St., Akron 2, Ohio, has been announced. The new firm will handle principally, forgings, iron and steel castings, stampings, screw machine products and a complete line of both stamped and cast industrial wheels as well as various plastics related to the metal industry. H. William Kranz, Jr., and Edmund G. Siess, Jr. are partners in this company.

• **WEST COAST PLANT**—Federated Metals Div., American Smelting & Refining Co., recently put into full operation at Los Angeles its new plant for production of intermediate zinc. The plant, constructed at a cost of nearly \$200,000, includes the latest handling equipment as well as improved smelting furnaces which use horizontal type retorts.

• **STAINLESS DISTRIBUTOR**—The American Rolling Mill Co. of Middletown, Ohio, has announced the appointment of J. M. Tull Metal & Supply Company, Inc., of Atlanta, as distributors for their complete line of stainless steel sheets, plates, bars, wire, and rolled stainless steel angles.

• **SILVER JUBILEE** — The Lyon-Raymond Corp. had open house for employees and community to celebrate its 25th anniversary under the management of George G. Raymond, president.

• **NORTON EXPANDS** — Norton Co., Worcester is constructing a one-story manufacturing plant at Hamilton, Ont., to be completed in March 1948 at a cost of \$160,000. In it more than \$200,000 of new equipment will be installed. At Chippawa, Ont., it is building a \$561,000 bauxite ore storage plant, 25,000 tons capacity, consisting of 14 reinforced concrete silos.

• **FOUNDRY FOUNDATION** — The foundry industry has announced the collection of \$81,330 from 143 contributors up to July 10 to endow a Foundry Educational Foundation. Peter Rent-schler of Hamilton, Ohio, is vice-president of the foundation. Various associations in the industry have joined in sponsoring the foundation for training men for operating and executive positions in foundries. Five of the leading universities, including the University of Cincinnati, will hold courses for this training.

• **OPENS DISTRICT OFFICE**—The Industrial Dept. of Dravo Corp., Pittsburgh, opened a Chicago office on July 1 to handle sales and service of Dravo counterflow direct fired heaters for commercial and industrial heating and Dravo crane cab coolers for air conditioning crane cabs in steel mills, foundries and chemical plants.

• **DEVELOPS MINE**—Eastern Gas & Fuel Associates are developing a high grade byproduct coal mine in Boone County, W. Va., scheduled to go into operation in October 1948. Initial production will be 2000 tons a day; eventually 4000 tons.

• **ELECTED PRESIDENT**—Harold A. Harty, advertising manager, Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co., Detroit, has been elected president of the Industrial Marketers of Detroit.

Steel Deliveries

(CONTINUED FROM PAGE 95)

mill had not received deferments, the condition in the East, if it continues, will be felt soon in this area. "The eastern mills will be entirely back in the midwest market before long, freight rates notwithstanding, and they are already back on a limited basis," this official said.

For the most part deferment requests and cancellations have been confined to bars, shapes, plates and specialties. Alloy and stainless steels have been easy for months anywhere in the country. In the last few weeks, low alloy high strength products have started to be a little easier.

In Chicago easing of steel supplies has been substantiated by consumers using many different types of products. One large tank manufacturer early in June was offered 300 tons of 1 in. x 100 in. x 337 in. plates. This tonnage was accepted and is the first bonus tonnage this company has secured. Other consumers report offerings in lighter plates, but these offerings are as yet rare. Countrywide 160 in. mill plates are now relatively easy. Cold drawn bars have lately eased to the extent that one such mill said, "We can't keep up with the paper work."

Observers here who first noted the recent swing in consumer demand, do not believe this is a prelude to a bust in the steel industry. Barring unforeseen work stoppages, the mills who have agreed with outside observers on present conditions, also agree that the overall demand for most products will hold up well for the balance of the year. Even the most optimistic concede sheet supplies will not be easy until the middle of next year, if then.

In testimony of these recent developments Pittsburgh observers cite the creation of a split sales organization at the top of the sales management of a large steel company in that area. The diverse position of different steel consumers, and therefore different products and mills, was officially recognized, these observers say, when one assistant general sales manager in charge of allocations and another in charge of solicitations assumed their new positions with this company on July 15.

Construction Steel . . .

New York

••• The estimated total bookings of fabricated structural steel for June, according to reports received by the American Institute of Steel Construction, Inc., amounted to 94,602 tons, a decrease of 24.8 pct under the average of 125,835 tons booked in the same month in the averaged 5 prewar years 1936 to 1940. The bookings for the first 6 months of the year, however, amounted to 732,477 tons, still showing a gain over the 691,271 tons booked in the same months in the prewar year period.

Shipments for the month of June reported at 133,024 tons continued at the rate established in the first 6 months of this year. The total shipments for the 6 months amounted to 825,413 tons or 22.6 pct greater than the averaged shipments in the same 6 months in the 5 prewar years.

The tonnage available for fabrication as of June 30 was 634,209 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1947	Estimated Total Tonnage for the Entire Industry Avg. 1936-1940
Contracts Closed		
January	104,973	107,578
February	125,881	96,280
March	149,634	124,558
April	147,207*	110,783
May	110,180*	126,237
June	94,602	125,835
Total	732,477	691,271
Shipments		
January	140,650	92,578
February	136,126	88,626
March	137,799	115,031
April	141,361*	123,650
May	136,453*	123,225
June	133,024	129,969
Total	825,413	673,079
Tonnage available for fabrication within the next 4 months		
	634,209	347,930

*Revised

••• Fabricated steel awards this week included the following:

700 Tons, Wilkes-Barre, Pa., bridge, Pennsylvania Dept. of Highways, to Wagner Construction Co., Kingston, Pa.

275 Tons, Entist, Winston & Skykomish, Wash., steel towers to Bethlehem Pacific Coast Steel Co., San Francisco.

••• Fabricated steel inquiries this week included the following:

6500 Tons, East St. Louis bridge across Mississippi River, William J. Howard Inc., Chicago, low bidder. This project indexed as an inquiry July 17.

1000 Tons, Orange, Tex., addition to plant, E. I. du Pont de Nemours & Co., Wilmington, Del., July 31.

400 Tons, Austin, Ind., bridge contract No. 2834, State Highway Dept.

250 Tons, Philadelphia, theater and store building, City Line Center Corp., July 31.

190 Tons, Alexandria, Minn., municipal power plant, Midwest Engineering Co., contractor.

140 Tons, St. Paul, Minn., pulp mill building, Midwest Engineering Co., contractor.

••• Reinforcing bar awards this week included the following:

2200 Tons, Chicago, Kostner Ave., sewer project, City of Chicago through Tully Construction Co. to Carnegie-Illinois Steel Corp., Pittsburgh.

600 Tons, Minot, N. D., veterans' hospital through McGough Construction Co. to Joseph T. Ryerson & Son, Inc., Chicago.

100 Tons, Cambridge, Mass., gas purifier unit for New England Gas & Electric Assn. to Concrete Steel Co., Boston.

••• Reinforcing bar inquiries this week included the following:

750 Tons, Boston, Nut Island sewerage treatment unit, Farina Bros., Inc., contractors.

385 Tons, Bell, Calif., bridge across Los Angeles River at Florence Ave., California Div. of Highways, Los Angeles, bids to Aug. 21.

To Select Technical Program for 1947 ASM Annual Meeting

Cleveland

••• Sixteen well-known metallurgists, members of the publications committee of American Society for Metals, met in Cleveland July 25, to select the technical program for the ASM 1947 annual meeting, which will be held as a part of the National Metal Congress and Exposition in Chicago, Oct. 18 to 24.

According to W. H. Eisenman, ASM secretary, the function of the publications committee is to receive and survey all papers which are presented before any meeting of the society.

Members of the publications committee are as follows: Walter Crafts, Union Carbide & Carbon Research Laboratories, chairman; Ray T. Bayless, ASM, secretary; Dr. R. H. Aborn, U. S. Steel Corp., Kearny, N. J.; H. I. Dixon, Sterling Alloys, Inc.; Dr. A. L. Field, Rustless Iron & Steel Corp.; Dr. J. H. Hollomon, General Electric Co., Schenectady; R. P. Koehring, Moraine Products Co.

Also Dr. H. B. Osborn, Jr., Ohio Crankshaft Co.; Dr. F. N. Rhines, Carnegie Institute of Technology; Dr. E. S. Rowland, Timken Roller Bearing Co.; Prof. G. A. Sellers, Kansas State College; L. E. Simon,

Electro-Motive Corp.; Dr. Gordon Sproule, McGill University, Montreal; Dr. R. L. Templin, Aluminum Co. of America, New Kensington, Pa.; Dr. A. R. Troiano, University of Notre Dame, Notre Dame, Ind., and Dr. H. S. VanVleet, American Can Co.

The publications committee also supervises the publication of Transactions, an annual publication of ASM, and aids the 71 chapters in securing technical papers and addresses.

Steel Composite Price Base Changed Slightly

New York

••• Drawn wire has been substituted for wire rods as one of the 10 items used in computing THE IRON AGE finished steel composite price. The change was decided upon to make the index more comprehensive. If there were no steel price changes this week the alteration of the base would have moved the finished steel composite price from 2.85664¢ per lb to 2.87118¢ per lb, an increase of approximately 30c a ton. The change will be made retroactively for 1947.

This weighted index is based on the following 10 classifications: Hot-rolled bars, structural shapes, plates, drawn wire, heavy rails, hot and cold-rolled sheets and strip and pipe—including butt, lap and electric weld, seamless tubing and conduit.

The index has two variables: prices and shipments. It is computed on the basis of American Iron & Steel Institute shipment data for the latest available quarter together with the prices prevailing on the date indicated for the 10 classifications listed. When final quarterly shipment data for a given quarter are available the composite price is recomputed for that period so that annual composite prices will be properly weighted as to distribution.

Sharon Elects Vice-Pres.

Detroit

••• Sharon Steel Products Co. announces the election of T. J. Moore, Jr. as a vice-president and director. Sharon Steel Products Co. is a wholly owned subsidiary of Sharon Steel Corp., Sharon, Pa.

MACHINE TOOLS

... News and Market Activities

Rise In Machine Tool Business More Than Industry Expected

... National Machine Tool Builders' Assn. has announced that shipments of machine tools in June totaled more than \$21,506,605, leaving unfilled orders totaling \$117,477,799, or about 5 months' backlog at the present rate of production.

According to responsible sources in the trade, higher prices drove in some of the June orders, but by and large the machine tool business seems to be better than the industry had any right to expect.

Price increases are still being made, many of which are 10 to 15 pct straight across the board, and are probably adequate to cover the price increases in pig iron and steel announced last week by major producers.

In Detroit a survey of machine tool dealers and manufacturers indicated little change in activity over the previous week. New models were in the air and numerous requests for quotations on equipment to be used, presumably on floor models, were being received by dealers and machine tool builders. Plans by individual manufacturers, however, remained as confused and nebulous as ever.

Chevrolet's recent decision to build a parts plant in Cleveland on the site originally intended for the light car plant has been a buoying influence here. While it is not expected that the new machine tool volume will be as large as that required for the light car, there are already indications that the new tooling program will be substantial. Work on the parts building is expected to start immediately.

A great deal of interest is centered here on developments in connection with new automatic transmissions and it would not be surprising if definite announcements by at least one manufacturer are forthcoming within a month or two at the latest.

In Cincinnati, major segments of the industry were rushing through last minute designs and preparations on machines to be

Price Increases Still Being Made to Cover Rise In Pig Iron and Steel

o o o

shown at the Machine Tool Show. While all activity centers around the show, most plants are continuing with their contract work and are keeping their shops busy. According to reports, inquiries are coming in from foreign customers a little more strongly than has been evident in the past few months, but orders are apparently pending on the show.

Some activity is felt in the lathe and shaper lines, with reports coming in that producers of this equipment are busy with their own lines and are not taking on contract work.

At the Machine Tool Show, Monarch Machine Tool Co., Sidney, Ohio, will show a new, high production hand screw machine equipped with an automatic electronic system for selecting and controlling speeds and feeds, making it a simple matter to set up as many as nine different speeds and six different feeds for each job, depending on the requirements of the successive operations.

Monarch will also show a high production, 10-in. precision manufacturing lathe with turret equipped to operate high speed air drills in two of its six stations.

In New York, inquiries are being made by several large companies for the outright purchase of entire machine shops in the metropolitan area, provided the plants have a good prewar steel purchasing record.

According to industrial purchasing sources, purposes of the purchases are: First, it has been difficult to get some medium-sized and larger shops to accept contracts at firm prices for production of metal parts needed for special machinery assemblies; second, a desire for more shops

with a steel purchasing history as a hedge against possible steel scarcities through the fourth quarter of 1948; and third, possible savings which might be made possible by consolidating more parts production under one roof, if more shop facilities could be obtained.

A definite sharp uptrend in the volume of special machinery building which will be required next year, since existing facilities in many special machinery lines have been inadequate to the post-war demand, is a strong underlying factor.

According to some manufacturers, small tool sales are expected to increase during the third quarter, because industrial buying has taken a sharp upward turn and industry-wide inventories are considered inadequate to meet the expanded postwar demand.

In Washington, a report on German machine tool practice stated that combination boring and milling machines and swivel head vertical milling machines were two of the very few new machine tools developed by the Germans during the war. The report, now on sale by the Office of Technical Services, Dept. of Commerce, was prepared by OTS investigators, L. E. Mehlhope and L. H. Martin, field engineers of Cincinnati Milling Machine Co. and Landis Tool Co., Waynesboro, Pa., which incidentally, last week shipped the first Machine Tool Show machine to Chicago.

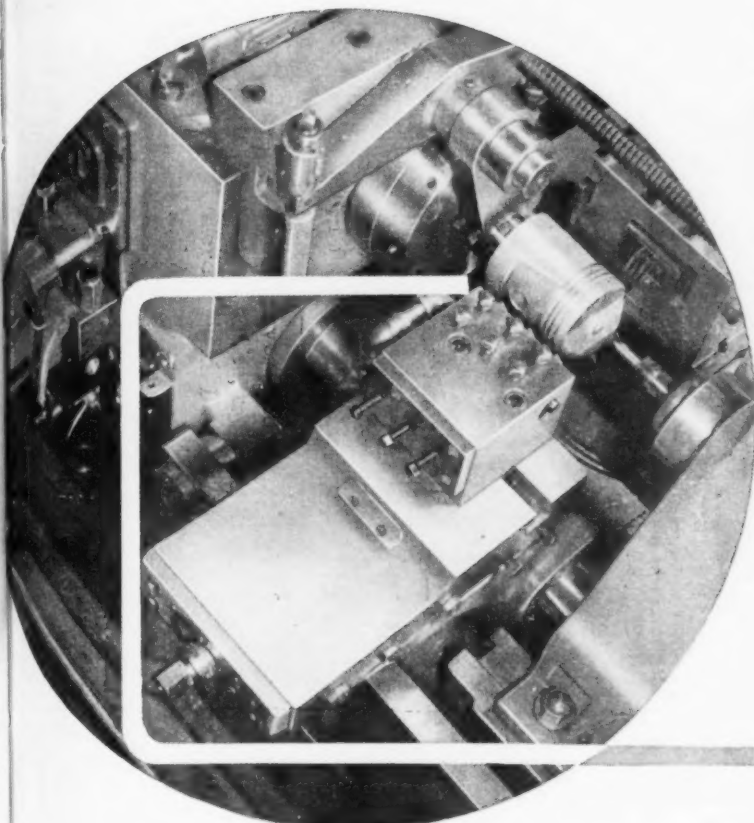
Investigators Mehlhope and Martin visited 26 German machine tool manufacturers of lathes, grinders and milling machines. Combination boring and milling machines were made to increase precision and save resetting of the work. Work was moved from one set of cutters to another in a simultaneous but not successive cycle.

In the grinding field, the investigators found a tendency to build machines with low power for a designated work swing.

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The versatility of the front carriage on this automatic lathe enables you to solve a great number of machining problems in the most efficient way.

Entirely hydraulic in operation, it permits many combinations of transverse and longitudinal motions at both feed and traverse rates. Many special combinations are possible on this standard machine. And still further variations may be obtained by means of special hydraulic equipment or cam guided blocks. A standard taper attachment can be utilized with any of the front carriage movements.

Versatility is only one of many outstanding advantages on the Gisholt Hydraulic Automatic Lathe. If speed, accuracy and easy operation can cut your costs on parts in large quantities or on a wide variety of small lots, ask for full information.

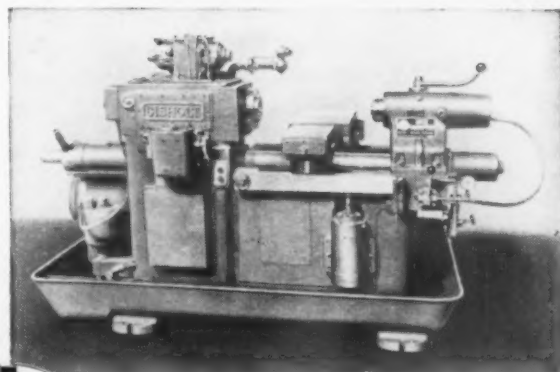
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THE FRONT CARRIAGE on the STANDARD No. 12 WILL PERFORM THE FOLLOWING CYCLES

<p>Traverse A-B Feed B-C Feed C-D Traverse D-A</p>	<p>Traverse A-B Feed B-C Relief C-D Traverse D-A</p>
Simple inexpensive additional control permit these:	
<p>Traverse A-B Feed B-C Traverse C-A</p>	<p>With "Blocking Valve"</p> <p>Traverse A-B Feed B-C Feed C-D Traverse D-A</p>
<p>Traverse A-B Feed B-C Traverse C-A</p>	<p>With "Blocking Valve"</p> <p>Traverse A-B Feed B-C Traverse C-A</p>
<p>Feed A-B Traverse B-A</p>	<p>With "Orifice Control Valve"</p> <p>Traverse A-B Feed B-C Feed C-D Traverse D-A</p>
<p>Feed A-B Relief B-C Traverse C-A</p>	<p>With "Reverse Feed Valve"</p> <p>Feed A-B Feed B-A</p>
	<p>With "Reverse Feed Valve"</p> <p>Traverse A-B Feed B-C Feed C-B+ Traverse B+-A</p>



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NONFERROUS METALS

... News and Market Activities

Copper

••• The supply position of copper, which had recently been improving to the point where some factors in the industry had been expecting a downward price revision in the near future, has been reversed completely by the threat of strikes at the smelters and refineries of Phelps-Dodge Corp., American Smelting & Refining Co. and the Kennecott Copper Co. Executives of some of these companies have confirmed the fact that a strike date has been set by the union but is being held in secret by them. It is reported that the strikes may be called as early as Tuesday of this week and at the latest are to be expected by next week. In addition the Braden Copper Co., Chilean mine subsidiary of Kennecott, went on strike last week. It is expected that the strike may not be long lived inasmuch as it is unauthorized and the government may be expected to step in and take some action. There is evidence that copper and brass scrap has dried up to some extent bringing prices higher last week. It has been estimated that the brass mills in the Connecticut Valley have as much as 5000 tons of shell scrap on hand. The brass mills are actively back in the copper market now that their vacation periods are coming to a close. Wire mills continue to operate at peak capacity and are taking all the copper they can obtain. Some mills are reported to have no available backlog of copper on hand. Copper futures continue to be marketed at a substantial discount from current market prices. As yet the market is very thin and it is expected that the prospective strike stoppages may result in a

significant rise in nearby futures prices.

Lead, Tungsten from Korea

Washington

••• Arrangements have been made to send unstated quantities of lead, scheelite, wolframite and tungsten from Korea to the U. S., it has been revealed by Gen. Douglas MacArthur's report for April. Mineral production is on the increase, he reported, with only copper showing a decrease in March as against increased output of tungsten, graphite, gold, silver and talc.

Lead Scrap To Be Sold

Washington

••• A new offering of 945 tons of lead scrap, recently received from Japan, will be sold by the U. S. Commercial Co., RFC subsidiary, on a sealed bid basis. It will be sold in nine lots of approximately 105 tons each, for delivery f.o.b. cars at sellers' warehouse, Staten Island, N. Y.

Terms and conditions of sale may be obtained from the government agency (Washington, D. C.) until Aug. 11; prospective bidders may arrange to inspect the material on Aug. 8.

Bronze Ingot Prices Up

••• Major producers have announced price increases on brass and bronze ingot, reflecting upward revisions of copper and brass scrap prices and more buying activity on the part of foundries since the vacation periods are coming to a close. In most grades the increases amount to a cent per lb. In the case of some few grades the increase amounts

to only $\frac{3}{4}$ ¢. Major grades of copper scrap have increased by $\frac{1}{2}$ ¢ per lb with readjustments to bring other grades into line with current market conditions.

De-Tinning Plant Sold

Washington

••• A \$1¼ million wartime tin reclamation plant in Birmingham, Ala., formerly operated by the Southern De-Tinning Co., has been sold to American Rock Wool Corp. for \$120,000 cash. It will be converted to manufacture and processing of rock-wool insulation after WAA removes the special purpose machinery which had been used for recovering tin oxide and black steel scrap from salvaged tin cans.

Copper, Nickel Output Up

Toronto

••• Production of new copper in Canada during May amounted to 20,432 tons, compared with 20,242 tons in April and 15,497 tons in May 1946. For the first five months this year cumulative production of copper in all forms totaled 90,667 tons, compared with 77,472 tons in the similar period of 1946.

Output of nickel in all forms in May amounted to 19,769,954 lb against 20,043,186 lb in April and 14,733,775 lb in May 1946. For the five months to May 31, production totaled 96,433,449 lb as compared with 75,163,735 lb in the same period last year.

Cleveland Graphite Net

Cleveland

••• Sales of \$9,211,812 and net profit of \$1,024,293 equal, after preferred dividends, to \$1.54 a share on the 643,840 common shares now outstanding, have been reported by Cleveland Graphite Bronze Co. for the second quarter of 1947.

In the preceding quarter sales were \$8,947,678 and net profit was \$1,055,823, equal to \$1.59 a share on the present number of common shares. Common stock was split two-for-one in May.

Nonferrous Metals Prices

Cents per pound

	July 23	July 24	July 25	July 26	July 28	July 29
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	\$17.00
Beryllium aluminum, 5% Be; dollars per lb contained Be	\$35.50
Aluminum, def'd	11.75
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper, electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$225
Iridium, dollars per troy oz.	\$30 to \$90
Lead, St. Louis	14.50
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask	
f.o.b. New York	\$85.00 to \$87.00
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$53 to \$56
Silver, New York, cents per troy oz.	64.75
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	\$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 Ingot	
No. 115	19.00
No. 120	18.50
No. 123	18.00
80-10-10 Ingot	
No. 305	23.00
No. 315	21.00
88-10-2 Ingot	
No. 210	28.75
No. 215	27.25
No. 245	21.25
Yellow Ingot	
No. 405	15.25
Manganese Bronze	
No. 421	17.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

5-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	13.75
No. 12 alum. (No. 2 grade)	13.25
108 alloy	13.50
195 alloy	14.25
AXS-679	13.75
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	12.50
Grade 3—90 pct-92 pct	11.75
Grade 4—85 pct-90 pct	11.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37½
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33½
Zinc, Cast, 99.99	18½
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.	
Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.	
Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.	

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base, B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSA. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 59¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, \$1.25-\$1.31; 24, \$1.71-\$1.75.

Round Rod: M. diam, in., ¼ to ¾, 47¢; ½ to ¾, 46¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M. size across flats, in., ¼ to ¾, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 46¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M. form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M. wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, \$1.21; 5/16 to ¾, \$1.12; ¾ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ¾, 89¢; ½ to ¾, 81¢; 0.065 to 0.082, ¾ to 1, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 69¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	53	71
Shot and blocks		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53		33.68
Copper, hot-rolled		30.03	
Copper, drawn		31.03	
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial			
bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural			
bronze	27.94		
*Seamless tubing.			

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14½
Loose yellow brass trimmings	15½

Copper and Brass

No. 1 heavy copper and wire	15 — 15½
No. 2 heavy copper and wire	14 — 14½
Light copper	13 — 13½
Auto radiators (unsweated)	8½ — 9
No. 1 composition	10½ — 11
No. 1 composition turnings	10 — 10½
Clean red car boxes	9 — 9½
Cocks and faucets	8½ — 9
Mixed heavy yellow brass	7 — 7½
Old rolled brass	7 — 7½
Brass pipe	8 — 8½
New soft brass clippings	11 — 11½
Brass rod ends	9½ — 10
No. 1 brass rod turnings	8½ — 9

Aluminum

Alum. pistons free of struts	3½ — 4
Aluminum crankcases	5 — 5½
2S aluminum clippings	8 — 8½
Old sheet & utensils	5½ — 6
Mixed borings and turnings	— 2
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6½
Old zinc	4½ — 4¾
Zinc routings	1½ — 2
Old die cast scrap	2½ — 3

Nickel and Monel

Pure nickel clippings	15½ — 17½
Clean nickel turnings	14 — 15
Nickel anodes	16 — 17
Nickel rod ends	17 — 18
New Monel clippings	10 — 10½
Clean Monel turnings	7 — 8
Old sheet Monel	9½ — 10
Old Monel castings	7½ — 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½ — 8
Nickel silver turnings, mixed	5½ — 6

Lead

Soft scrap lead	10 — 10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	6½ — 7
Castings	4½ — 5½

Miscellaneous

Block tin	63 — 65
No. 1 pewter	48 — 50
No. 1 auto babblitt	38 — 40
Mixed common babblitt	11½ — 12
Solder joints	12 — 13
Siphon tops	38 — 39
Small foundry type	13 — 13½
Monotype	12 — 12½
Lino and stereotype	11½ — 12
Electrotype	9½ — 10
New type shell cuttings	11 — 11½
Clean hand picked type shells	4½ — 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.	
Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

Prices Again Climb to New High Ground

New York

... Heavy melting steel prices shot up again this week, carrying many to new all time record highs. An advance of \$1.50 at Pittsburgh and one of \$1 in Philadelphia pushed THE IRON AGE scrap composite to \$40.83. It has never been higher. The Chicago price, the third factor in this average of No. 1 heavy melting steel quotations, did not move this week.

These latest gains were not as whopping as those recorded last week. And while shipments were nowhere equal to demand, there were signs that some dealers thought it no longer advisable to hold out for higher prices. But others were looking for even lusher prices.

Detroit, taking a late cue from neighboring marts, moved up an average of \$3.50 a ton for heavy melting steel and "similar" grades. But the biggest zoom of the week came in the Youngstown area where No. 1 steel sold for \$45, a whopping \$5 higher for the week. Cleveland buyers added a cool \$4.25 to their steel scrap prices, where they were quoted at \$42 to \$43 a ton. Boston brokers were paying \$2.25 more and New York \$1.50 higher for the heavier steel grades.

Foundries, with summer vacations cutting down the overall melt, and with pig iron a bit easier, were not bidding up the cast grades. What few advances there were (in Detroit, Philadelphia and Birmingham) came mainly from steel mill buying.

PITTSBURGH—Sales at \$41.50 to \$42 a ton range this week raised prices of openhearth grades of scrap \$1.50 a ton. Railroad offerings, awards on which have been delayed somewhat, brought railroad grades up sharply. On the whole, scrap movement is rather slow, with the biggest buyer in the district still out of the local market. Turnings are scarce, even at present elevated prices. The increase in low phos prices reflects the combination of short supply; acute foundry demand; and the increase in prices of railroad specialty items. Some of the

bullishness of the market has given way to buying and selling hesitancy. At present levels brokers will not take long-range risks, but are trying to buy at current prices and will not make any long range offers. Consequently the price is bringing the market to an impasse where potential purchases only become confirmed when brokers have covered.

CHICAGO—Scrap is moving in good volume with brokers and dealers trying to clean up the old orders, take their losses and start over. Mills continue to reach out of the district to tie up available material. Scrap from this source ranges from \$42.50 to \$45 delivered. The mills who attempted to keep prices down by buying little if any open market scrap have now been forced to reenter the market. Competition at the moment is as high as it has ever been with present broker prices well over the last consumer figure. No railroad lists were sold last week.

PHILADELPHIA—The scrap market continues to strengthen here and heavy melting grades were sold at a top price of \$41. Turnings are also up \$1 for machine shop and shoveling and \$2 for mixed borings and turnings. Cast grades are reported to be up \$1, as well as low phos. Shipments are said to be improving. Brokers are reported to be bidding excitedly for scrap.

NEW YORK—The price of heavy melting steel scrap moved up another \$1.25 this week to \$35.25 in New York. On the Jersey side of the river \$1 more was being paid. Though brokers had been having difficulty in filling orders there has recently been some improvement, with several dealer shipments of 500 to 1000 tons reported. Some observers think dealers may have decided prices are near their highs and are no longer holding material. However demand still exceeds supply and price resistance by mills appears to be stiffening.

DETROIT—The scramble for scrap continues here unabated. In response to soaring scrap prices in large steel centers the Detroit price is up \$3.75 per ton this week for openhearth grades, the largest price jump yet recorded during a single week. This may be an all time high for Detroit scrap yet the end is not in sight. Cast grades are also firm but stiff price advances have not been reported as in the case of other grades.

CLEVELAND—With brokers paying \$41.50 to cover on old orders, the price of No. 1 heavy melting steel rose to \$45 in the Valley this week on the basis of some quiet ordering, as shipments to most consumers continued to lag far behind consumption. Consumers are mak-

ing a drive for customer scrap at \$39.50, and hoping that such action will exert a stabilizing influence on a scrap market which is terrifically strong and features a number of conversion deals. Brokers are paying \$46 for low phos, and the price of turnings was erratic early in the week.

BOSTON—If points of delivery are a criterion, brokers are still covering old orders on a market running against them. New orders are few and far between. One is for turnings for a Canadian subsidiary of a domestic melter for which a premium of \$1 has been paid in at least one case. July chemical borings production was about 50 per cent of normal, but demand is light and prices no more than firm. Most foundries should be operating by Aug. 4. All can use cast. So far coke costs them no more.

BUFFALO—The market simmered this week as offerings at the \$38 level dried up and mills declined to pay higher prices for openhearth grades. Brokers were reported to have paid \$42 to cover a sale of strictly number one industrial scrap made at \$41.50. A sharp increase in tie-in business and comparatively higher prices paid by Pittsburgh mills in the section east of Rochester have reduced the tonnage moving through dealers yards. Some 3000 tons of steelmaking scrap is due by barge from New York this weekend.

ST. LOUIS—Scrap iron price went up again this week from \$1.50 to \$2 a ton in a brokers' market. The short interest among brokers is still heavy and at prices far below present market prices. Jittery buying in competition with other markets, plus a short supply, shoved the market up. Mills are buying sparsely at present levels.

BIRMINGHAM—Both brokers and consumers here are reluctant to commit themselves until a very uncertain price situation clarifies. Supplies in dealers' yards are being held for even higher prices. The little material moving is largely industrial and automotive scrap.

TORONTO—General conditions in the Canadian scrap markets failed to show improvement during the past week. Ceiling prices continue to discourage domestic collections in rural districts, although some local dealers have been sending out cards and letters to mining and other companies, asking them to dig out their scrap and make it available. Some relief has been forthcoming through importations of scrap and it is stated that about 75,000 tons have arrived in Canada so far this year from outside sources. Additional large tonnages will continue to flow in over the coming months as a result of contracts already made by steel mills. However, a serious shortage still prevails, both in steel making and foundry scrap.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 heavy melting	\$41.50 to \$42.00
RR. hvy. melting	42.75 to 43.25
No. 2 hvy. melting	41.50 to 42.00
RR. scrap rails	43.00 to 44.00
Rails 2 ft. and under	47.50 to 48.00
No. 1 comp'd bundles	41.50 to 42.00
Hand bldd. new shts.	41.50 to 42.00
Hvy. axle turn.	41.00 to 41.50
Hvy. steel forge turn.	41.00 to 41.50
Mach. shop turn.	33.00 to 34.00
Shoveling turn.	34.50 to 35.00
Mixed bor. and turn.	33.00 to 34.00
Cast iron borings	34.00 to 34.50
No. 1 cupola cast	39.50 to 40.00
Hvy. breakable cast	37.00 to 37.50
Malleable	52.00 to 53.00
RR. knuck and coup.	48.00 to 49.00
RR. coil springs	48.00 to 49.00
RR. leaf springs	48.00 to 49.00
Rolled steel wheels	48.00 to 49.00
Low phos.	48.00 to 48.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00 to \$40.50
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	40.00 to 40.50
No. 2 dealers' bundles	39.00 to 39.50
Bundled mach. shop turn.	39.00 to 39.50
Galv. bundles	37.00 to 37.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Mix. borings & turn.	34.50 to 35.50
Low phos. hvy. forge	45.00 to 46.50
Low phos. plates	42.00 to 44.00
No. 1 RR. hvy. melt.	41.50 to 42.50
Rerolling rails	45.00 to 46.00
Miscellaneous rails	42.50 to 43.50
Angles & splice bars	45.50 to 46.00
Locomotive tires, cut	45.00 to 46.00
Cut bolster & side frames	44.00 to 45.00
Standard stl. car axles	45.00 to 46.00
No. 3 steel wheels	44.00 to 44.50
Couplers & Knuckles	46.00 to 47.00
Malleable	58.00 to 59.00
No. 1 mach. Cast.	47.00 to 48.00
Rails 2 ft. and under	47.00 to 47.50
No. 1 agricul. cast.	42.00 to 43.00
Hvy. breakable cast.	39.00 to 41.00
RR. grate bars	41.00 to 42.00
Cast iron brake shoes	41.00 to 42.00
Cast iron carwheels	43.00 to 44.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$35.50 to \$36.00
No. 2 hvy. melting	35.50 to 36.00
No. 1 bundles	35.50 to 36.00
No. 2 bundles	35.50 to 36.00
Mach. shop turn.	30.50 to 31.00
Shoveling turn.	32.50 to 33.00
Cast iron borings	30.50 to 31.00
Mixed bor. & turn.	30.00 to 30.50
Low phos. plate	41.00 to 42.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	37.00 to 38.00
Scrap rails	41.00 to 42.00

BOSTON

Dealers' buying prices per gross ton.

f.o.b. cars:

No. 1 hvy. melting	\$35.50 to \$36.50
No. 2 hvy. melting	34.50 to 35.00
Nos. 1 and 2 bundles	34.50 to 35.00
Busheling	34.50 to 35.00
Shoveling turn.	28.00 to 28.50
Machine shop turn.	26.00 to 26.50
Mixed bor. & turn.	26.00 to 26.50
C'n cast. chem. bor.	26.00 to 27.00
No. 1 machinery cast.	40.00 to 41.50
No. 2 machinery cast.	40.00 to 41.50
Heavy breakable cast.	40.00 to 45.00
Stove plate	40.00 to 45.00

DETROIT

Per gross ton, brokers' buying prices,

f.o.b. cars:

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
New busheling	37.00 to 38.00
Flashings	37.00 to 38.00
Mach. shop turn.	28.00 to 29.00
Shoveling turn.	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
Low phos. plate	39.50 to 40.50
No. 1 cupola cast.	39.50 to 40.50
Hvy. breakable cast.	31.00 to 32.00
Stove plate	32.00 to 34.00
Automotive cast.	38.00 to 40.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	31.00 to 32.00
Shoveling turn.	32.00 to 33.00
Mixed bor. & turn.	31.00 to 32.00
Clean cast chemical bor.	33.00 to 34.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	47.00 to 48.00
Cast. charging box.	47.00 to 48.00
Clean auto cast.	48.00 to 49.00
Hvy. axle forge turn.	40.00 to 41.00
Low phos. plate	44.00 to 45.00
Low phos. punchings	44.00 to 45.00
Low phos. bundles	43.00 to 44.00
RR. steel wheels	45.00 to 46.00
RR. coil springs	45.00 to 46.00
RR. malleable	55.00 to 57.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	38.00 to 39.00
Bundled sheets	38.00 to 39.00
Mach. shop turn.	31.25 to 32.25
Locomotive tires, uncut	41.00 to 42.00
Mis. std. sec. rails	42.00 to 43.00
Rerolling rails	48.00 to 49.00
Steel angle bars	40.00 to 41.00
Rails 3 ft. and under	43.00 to 44.00
RR. steel springs	40.50 to 41.50
Steel car axles	41.50 to 42.50
Grate bars	38.00 to 39.00
Brake shoes	38.00 to 39.00
Malleable	58.00 to 59.00
Cast iron car wheels	42.00 to 43.00
No. 1 machinery cast.	43.00 to 44.00
Hvy. breakable cast	35.00 to 36.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$35.50 to \$36.00
No. 2 hvy. melting	35.50 to 36.00
No. 2 bundles	35.50 to 36.00
No. 1 busheling	35.50 to 36.00
Long turnings	24.00 to 24.50
Shoveling turnings	26.00 to 27.00
Cast iron borings	24.50 to 25.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	42.00 to 42.50
Stove plate	40.00 to 40.50
No. 1 RR. hvy. melt.	36.50 to 37.00
Steel axles	38.50 to 39.00
Scrap rails	38.50 to 39.00
Rerolling rails	40.50 to 41.00
Angles & splice bars	40.50 to 41.00
Rails 3 ft. & under	40.50 to 41.00
Cast iron carwheels	35.00 to 36.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	44.00 to 45.00
Mach. shop turn.	33.00 to 34.00
Short shov. turn.	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos.	46.00 to 47.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$35.25
No. 2 hvy. melting	35.25
No. 2 bundles	35.25
Comp. galv. bundles	33.25
Mach. shop turn.	\$27.00 to 28.00
Mixed bor. & turn.	27.00 to 28.00
Shoveling turn.	29.00 to 30.00
No. 1 cupola cast.	41.00 to 41.50
Hvy. breakable cast.	41.00 to 41.50
Charging box cast.	41.00 to 41.50
Stove plate	41.00 to 41.50
Clean auto cast.	41.00 to 41.50
Unstrip. motor blks.	37.00 to 38.00
C'n chem. cast bor.	29.00 to 30.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	38.00 to 39.00
Mach. shop turn.	28.00 to 29.00
Shoveling turn.	30.00 to 31.00
Cast iron borings	28.00 to 29.00
Mixed bor. & turn.	28.00 to 29.00
No. 1 cupola cast.	38.00 to 40.00
Charging box cast.	33.00 to 35.00
Stove plate	35.00 to 38.00
Clean auto cast.	38.00 to 40.00
Malleable	39.00 to 41.00
Low phos. plate	38.00 to 40.00
Scrap rails	37.00 to 38.00
Rails 3 ft. & under	40.00 to 42.00
RR. steel wheels	40.00 to 42.00
Cast iron carwheels	40.00 to 42.00
RR. coil & leaf spgs.	40.00 to 42.00
RR. knuckles & coup.	40.00 to 42.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	42.00 to 43.00
Drop forge flashings	42.00 to 43.00
Mach. shop turn.	32.00 to 33.00
Shoveling turn.	33.00 to 34.00
No. 1 busheling	42.00 to 43.00
Steel axle turn.	42.00 to 43.00
Cast iron borings	33.00 to 34.00
Mixed bor. & turn.	32.00 to 32.50
Low phos.	43.00 to 44.00
No. 1 machinery cast.	47.00 to 47.50
Malleable	54.00 to 55.00
RR. Cast.	47.00 to 47.50
Railroad grate bars	42.00 to 44.00
Stove plate	42.00 to 44.00
RR. hvy. melting	42.00 to 43.00
Rails 3 ft. & under	47.00 to 48.00
Rails 18 in. & under	48.00 to 49.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	25.00
No. 1 cupola cast.	\$32.00 to 33.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast.	\$32.00 to 33.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$22.00
Elec. furn. 1 ft. und.	\$25.50 to 27.00
No. 1 cupola cast.	29.00
RR. hvy. melting	23.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(cents per pound)				
Hot-rolled sheets	2.80	2.50	2.50	2.425
Cold-rolled sheets	3.55	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.95	3.55	3.55	4.05*
Hot-rolled strip	2.80	2.50	2.50	2.35
Cold-rolled strip	3.55	3.20	3.20	3.05
Plates	2.95	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	30.30

*24 ga

Tin and Terneplate:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(dollars per base box)				
Tinplate, standard cokes	\$5.75	\$5.75	\$5.75	\$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30

Bars and Shapes:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(cents per pound)				
Merchant bars	2.90	2.60	2.60	2.50
Cold-finished bars	3.55	3.20	3.20	3.10
Alloy bars	3.30	3.05	3.05	2.92
Structural shapes	2.80	2.50	2.50	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	6.15	6.15	6.15	4.76

Wire and Wire Products:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(cents per pound)				
Bright wire	3.55	3.30	3.30	3.05
Wire nails	4.25	3.75	3.75	3.75

Rails:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(dollars per 100 lb)				
Heavy rails	\$2.50	\$2.50	\$2.50	\$43.39*
Light rails	2.85	2.85	2.85	49.18*

*per net ton

Semifinished Steel:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(dollars per gross ton)				
Rerolling billets	\$50.00	\$42.00	\$42.00	\$39.00
Sheet bars	59.00	53.00	53.00	38.00
Slabs, rerolling	50.00	42.00	42.00	39.00
Forging Billets	58.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	66.00	61.00	61.00	58.43

Wire Rods and Skelp:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(cents per pound)				
Wire rods	2.85	2.55	2.55	2.30
Skelp	2.65	2.35	2.35	2.05

Pig Iron:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(per gross ton)				
No. 2, foundry, Phila.	\$40.39	\$39.22	\$36.51	\$30.34
No. 2, Valley furnace	36.50	36.50	33.50	28.50
No. 2, Southern, Cin'ti	38.25	38.25	34.75	28.94
No. 2, Birmingham	33.38	33.38	29.88	24.88
No. 2, foundry, Chicago†	36.00	36.00	33.00	28.50
Basic, del'd Philadelphia	39.89	39.89	36.92	29.84
Basic, Valley furnace	36.00	36.00	33.00	28.00
Malleable, Chicago†	36.50	36.50	33.50	28.50
Malleable, Valley	36.50	36.50	33.50	28.50
Charcoal, Chicago	48.49	48.49	48.49	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ For carlots at seaboard.

Scrap:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(per gross ton)				
Heavy melt'g steel, P'gh.	\$41.75	\$40.25	\$35.75	\$20.00
Heavy melt'g steel, Phila.	40.50	39.50	37.25	18.75
Heavy melt'g steel, Ch'go.	40.25	40.25	33.75	18.75
No. 1, hy. comp. sheet, Det.	37.50	34.00	33.25	17.32
Low phos. Youngs'n.	46.50	43.25	38.75	22.50
No. 1, cast, Pittsburgh	39.75	39.75	36.50	20.00
No. 1, cast, Philadelphia	48.50	47.50	46.50	20.00
No. 1, cast, Chicago	47.50	47.50	44.00	20.00

Coke, Connellsville:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(per net ton at oven)				
Furnace coke, prompt	\$12.00	\$12.00	\$10.50	\$8.75
Foundry coke, prompt	13.75	13.75	11.25	9.85

Nonferrous Metals:	July 29, 1947	July 22, 1947	July 1, 1947	July 30, 1946
(cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled. See p. 103 for change in base.

Composite Prices . .

FINISHED STEEL

July 29, 1947	3.16613¢ per lb.
One week ago	2.87118¢ per lb.
One month ago	2.87118¢ per lb.
One year ago	2.73011¢ per lb.

HIGH	LOW
1947.... 3.16613¢ July 29	2.87118¢ Jan. 7
1946.... 2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945.... 2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944.... 2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943.... 2.29176¢	2.29176¢
1942.... 2.28249¢	2.28249¢
1941.... 2.43078¢	2.43078¢
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933.... 1.95578¢ Oct. 3	1.75836¢ May 2
1932.... 1.89196¢ July 5	1.83901¢ Mar. 1
1931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930.... 2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....\$36.38 per gross ton.....
.....\$36.18 per gross ton.....
.....\$33.15 per gross ton.....
.....\$28.12 per gross ton.....

HIGH	LOW
\$36.38 July 29	\$30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
\$23.61	\$23.61
23.61	23.61
23.61	23.61
\$23.61 Mar. 20	\$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.90 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 3
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.21 Jan. 7	15.90 Dec. 16
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

.....\$40.83 per gross ton.....
.....\$40.00 per gross ton.....
.....\$35.58 per gross ton.....
.....\$19.17 per gross ton.....

HIGH	LOW
\$40.83 July 29	\$29.50 May 20
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
\$19.17	\$19.17
19.17	19.17
\$22.00 Jan. 7	\$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	8.50 Dec. 29
15.00 Feb. 18	11.25 Dec. 9
17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

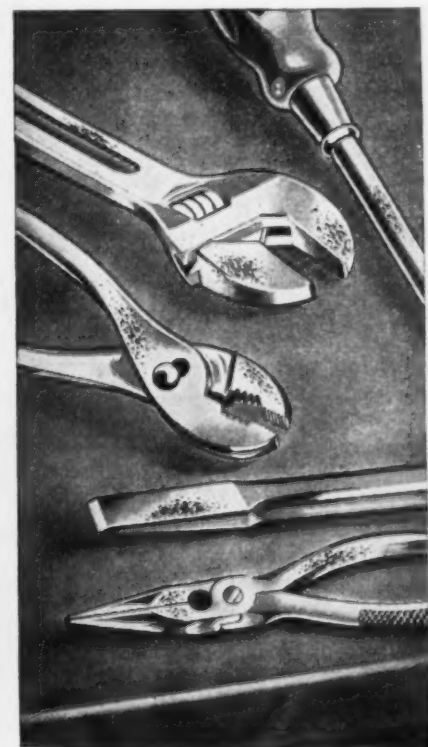
RUST PREVENTION

\$100,000 Worth of Hand Tools saved from "RUST"

NEW PRODUCT DOES THE JOB AFTER PLANT
CONDUCTS EXHAUSTIVE TESTS

"Some time ago, we were called in by a prominent manufacturer.* Corrosion of all metal parts in his entire plant had gone out of control. The machine shop and hand tools, valued in excess of \$100,000, were a sorry looking 'dusty-brown.' Everything they had used in the way of rust preventives heretofore failed to solve their difficulty.

"After studying their problem we recommended our General Purpose



Anti-Corrode No. 100 and suggested that they give it exhaustive tests. Their chemist did so and we are happy to report that it solved their problem.

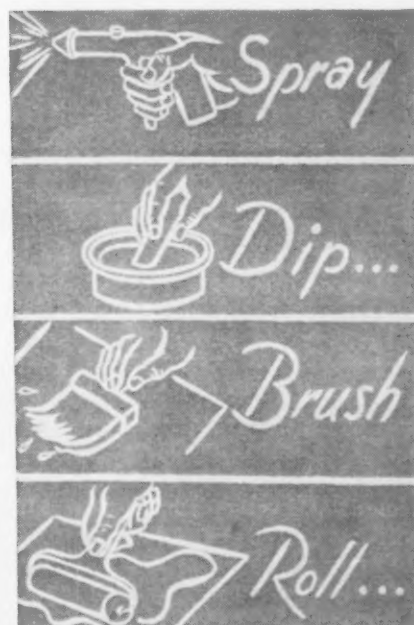
**Used on
Hand Tools
As Well**

"They have since used over 150 gallons of this Anti-Corrode on everything metal in their plant, including small hand tools such as pliers and screw drivers."

Anti-Corrode No. 100 is one of several new types of Cities Service protective coatings for metals. Designed to prevent corrosion of raw stocks, finished parts and completed ma-

chines, it adheres firmly, displaces moisture and protects longer than many materials now on the market.

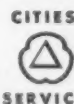
Easy To Apply Apply Anti-Corrode by ordinary work-shop methods. Spray, dip, brush or roll it on. The protective film is continuous and non-porous—does not break at sharp edges nor rupture on flat surfaces. It need not be removed from metal to be stamped, drawn or otherwise formed.



Cities Service will demonstrate the many advantages of Anti-Corrode to you in your own plant. Contact the branch office nearest you or write Cities Service Oil Co., 60 Wall Tower, New York 5, N. Y.

**Name on request*

Cities Service means Great Service



Cities Service Oil Co.
NEW YORK • CHICAGO
Arkansas Fuel Oil Co.
SHREVEPORT, LA.

(This offer available only in Cities Service marketing territories East of the Rockies.)

**CITIES SERVICE OIL COMPANY
SIXTY WALL TOWER
NEW YORK 5, N. Y., ROOM**

Gentlemen: I'd like to test ANTI-CORRODE No. 100 on my own equipment FREE OF CHARGE. Send me details.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

THE IRON AGE, July 31, 1947—111

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to consumer. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only; includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) to 0.035 to 0.075 in. thick by 3/4 to 3 1/2 in. wide. (16) Spot market as high as \$92 gross ton. (17) Delivered Los Angeles; add 1/2c per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases.

Basing Points													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	San Francisco, Los Angeles, Seattle	Detroit	New York	Phila- delphia	
INGOTS															
Carbon, rerolling															
Carbon, forging	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00								
Alloy	\$52.00														
BILLETS, BLOOMS, SLABS															
Carbon, rerolling ^{1,8}	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00				\$53.00			
Carbon, forging billets	\$58.00	\$58.00	\$58.00	\$58.00	\$58.00	\$58.00	\$58.00	\$58.00				\$61.00			
Alloy	\$66.00	\$66.00				\$66.00						\$69.00			
SHEET BARS ^{1,6}							\$59.00								
PIPE SKELP	2.65¢	2.65¢					2.65¢	2.65¢							
WIRE RODS	2.85¢	2.85¢		2.85¢	2.85¢							3.27¢ ¹³			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	3.175¢	(Ashland, Ky. = 2.80¢)	3.24 ¹⁷ ¢	2.95¢	3.09¢	3.00¢	
Cold-rolled ¹	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢		3.70¢	3.96¢	3.93¢	
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	4.32¢ ¹⁷		4.24¢	4.15¢	
Enameling (12 gage)	3.95¢	3.95¢	3.95¢	3.95¢			3.95¢		4.05¢	3.95¢		4.10¢	4.35¢	4.33¢	
Long ternes ² (10 gage)	4.05¢	4.05¢	4.05¢										4.45¢	4.41¢	
STRIP															
Hot-rolled ³	2.80¢	2.80¢	2.80¢	2.80¢ ¹⁵	2.80¢		2.80¢					2.95¢	3.23¢	3.18¢	
Cold-rolled ⁴	3.55¢	3.65¢		3.55¢			3.55¢			(Worcester = 3.75¢)		3.70¢	3.96¢	3.93¢	
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢						3.39¢		
TINPLATE															
Standard cokes, base box	\$5.75	\$5.75	\$5.75		\$5.85			\$5.85	\$5.85		(Warren, Ohio = \$5.75)	\$6.175	\$6.082 ¹¹		
Electro, box: 0.25 lb. 0.50 lb. 0.75 lb.															
BLACKPLATE, 29 gage ⁵	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢				3.99¢	3.90¢	
BLACKPLATE, CANMAKING															
55 lb. to 70 lb. 75 lb. to 95 lb. 100 lb. to 118 lb.															
TERNES, MFG., Special coated															
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢				3.285¢	3.05¢	3.31¢	3.28¢	
Rail steel ⁶															
Reinforcing (billet) ⁷	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢			2.985¢		3.04¢	2.95¢	
Reinforcing (rail)															
Cold-finished ⁸	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢						3.70¢	3.96¢	3.93¢	
Alloy, hot-rolled	3.30¢	3.30¢				3.30¢	3.30¢			(Bethlehem, Massillon, Canton = 3.30¢)		3.45¢		3.44¢	
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢						4.25¢			
PLATE															
Carbon steel ¹²	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢	(Coatesville = 3.15¢, Claymont = 3.15¢, Geneva, Utah = 2.80¢)	2.95¢	3.46¢ ¹⁴		3.17¢	3.15¢	
Floor plates	3.90¢	3.90¢											4.30¢	4.28¢	
Alloy	3.79¢	3.79¢								(Coatesville = 4.45¢)			4.01¢	3.895¢	
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢			(Geneva, Utah = 2.65¢) (Bethlehem = 2.80¢)		3.17¢ ¹⁰		3.00¢	2.94¢	
SPRING STEEL, C-R															
0.26 to 0.40 carbon	3.20¢			3.20¢					(Worcester = 3.40¢)						
0.41 to 0.60 carbon	4.70¢			4.70¢					(Worcester = 4.90¢)						
0.61 to 0.80 carbon	5.30¢			5.30¢					(Worcester = 5.50¢)						
0.81 to 1.00 carbon	6.80¢			6.80¢					(Worcester = 7.00¢)						
Over 1.00 carbon	9.10¢			9.10¢					(Worcester = 9.30¢)						
MANUFACTURERS' WIRE ⁹															
Bright	3.55¢	3.55¢		3.55¢	3.55¢				(Worcester = 3.65¢, Duluth = 3.60¢)		4.31¢ ¹³		3.96¢	3.93¢	
Galvanized															
Spring (high carbon)	4.25¢	4.25¢		4.25¢					(Worcester = 4.35¢, Duluth = 4.50¢) (Trenton = 4.50¢)		5.28¢ ¹³		4.66¢	4.595¢	
PILING, Steel sheet	3.30¢	3.30¢				3.30¢							3.71¢	3.65¢	

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading.	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville.	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville.	27.50	28.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleva, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet.	27.50	28.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton.	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi.	27.50	28.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleva, Newark, N. J., Reading, Canton, Youngstown.	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleva, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne.	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleva, Balt, Reading, Dunkirk, Canton.	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse.	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.).	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)

W	Cr	V	Mo	Base per lb
1.5	4	1	—	74¢
1.5	4	1.5	—	59¢
6	4	2	6	63¢
High-carbon-chromium*				47¢
Oil hardening manganese*				26¢
Special carbon*				24¢
Extra carbon*				20¢
Regular carbon*				16¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb No. 1 O.H., per 100 lb.	\$2.50
Angle splice bars, 100 lb. (F.o.b. basing points)	3.00
Light rails (from billets)	\$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45

Base per lb

Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

20x14 in. 20x28 in.	
8-lb coating I.C.....	\$6.75 \$13.50

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa....	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville..	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville..	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	9.00	....

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base Delivered per 100 lb	San Francisco
Standard & coated nails	\$4.25†	\$5.33
Galvanized nails††	4.00	5.08
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester. ††Plus \$2.75 per 100 lb galvanizing extra.

	Base per 100 lb	
Annealed fence wire	\$4.20†	\$5.21
Annealed galv. fence wire	4.65†	5.66
†10¢ additional at Worcester.		
To the dealer f.o.b. Pittsburgh, Chicago, Birmingham		

	Base column
Woven wire fence*	91
Fence posts, carloads....	90††
Single loop bale ties	91
Galvanized barbed wire**	101
Twisted barbed wire...	90

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldo-cor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-cloy	Yoloy	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Great Lakes Steel
Plates.....	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
Sheets									
Hot-rolled ..	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85
Cold-rolled...	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	4.75
Galvanized ..	....	5.40	....	....	....	5.40	....	....	....
Strip									
Hot-rolled ..	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	3.85
Cold-rolled...	....	4.75	....	....	....	4.75	4.75	4.75	4.75†
Shapes.....	....	3.85	....	....	3.85	3.85	3.85	3.85	....
Beams.....	....	3.85	....	....	....	3.85	....	....	....
Bars									
Hot-rolled ..	4.00	4.00	4.00	....	....	4.00	4.00	4.00	4.00
Cold-rolled...	....	....	....	....	....	....	....	4.60	....
Bar shapes....	....	4.00	....	....	4.00	4.00	4.00	4.00	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PRICES

PIPE AND TUBING

Base discounts. F.o.b. Pittsburgh and Lorain, steel butt weld and seamless. Others f.o.b. Pittsburgh only
Base price, \$200.00 per net ton

The prices shown below are nominal and all products have been advanced an average of \$8 a ton on black and \$10 a ton on galvanized. New discounts will be published when announced.

Standard, threaded & coupled

Steel, butt weld	Black	Galv.
1/2-in.	55 1/2	41
3/4-in.	58 1/2	43
1 to 3-in.	60 1/2	47 1/2

Wrought iron, butt weld

1/2-in.	2	+20
3/4-in.	11 1/2	+10
1 and 1 1/2-in.	17	+2
1 1/2-in.	22 1/2	1 1/2
2-in.	23	2

Steel, lap weld

2-in.	53	39 1/2
2 1/2 and 3-in.	56	42 1/2
3 1/2 to 6-in.	58	44 1/2

Steel, seamless

2-in.	52	38 1/2
2 1/2 and 3-in.	55	41 1/2
3 1/2 to 6-in.	57	43 1/2

Wrought iron, lap weld

2-in.	14 1/2	+5 1/2
2 1/2 to 3 1/2-in.	17	+1 1/2
4-in.	21	4
4 1/2 to 8-in.	19	2 1/2

Extra Strong, plain ends

Steel, butt weld		
1/2-in.	54 1/2	41 1/2
3/4-in.	58 1/2	45 1/2
1 to 3-in.	60	48

Wrought iron, butt weld

1/2-in.	6 1/2	+14
3/4-in.	12 1/2	+8
1 to 2-in.	22	2

Steel, lap weld

2-in.	52	39 1/2
2 1/2 and 3-in.	56	43 1/2
3 1/2 to 6-in.	59 1/2	47

Steel, seamless

2-in.	51	38 1/2
2 1/2 and 3-in.	55	42 1/2
3 1/2 to 6-in.	58 1/2	46

Wrought iron, lap weld

2-in.	17 1/2	+2
2 1/2 to 4-in.	26	8 1/2
4 1/2 to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft., f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft. inclusive.

OD Gage	Hot- Rolled	Cold- Drawn	Electric Weld Hot- Rolled	Cold- Drawn
2 in. BWG	15.29	18.17	15.00	17.95
2 1/2	20.57	24.43	20.11	24.07
3	22.87	27.18	22.26	26.68
3 1/2	28.86	34.30	28.06	33.64
4	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	\$85.06
6-in. to 24-in. del'd New York	83.30
6-in. to 24-in., Birmingham	74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	98.50
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots	Percent Off List
1/2 in. & smaller x 6 in. & shorter	48
9/16 & 5/8 in. x 6 in. & shorter	50
All larger diam and longer lengths	47
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)	
1/2 in. and smaller	48
9/16 to 1 in. inclusive	47
1 1/4 to 1 1/2 in. inclusive	45
1 3/4 in. and larger	40

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts USS SAE

Base discount less case lots	
7/16 in. and smaller	51
1/2 in. and smaller	50
1/2 in. through 1 in.	48
9/16 in. through 1 in.	49
1 1/4 in. through 1 1/2 in.	47
1 3/4 in. and larger	40

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Consumer	
Packages, nuts separate	65 and 10
In bulk	75
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.	

Large Rivets (1/2 in. and larger)

Base per 100 lb	
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets (7/16 in. and smaller)

Percent Off List	
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws

Percent Off List	Consumer
(In packages)	
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
1/2 to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Base price per short ton	
Effective CaF ₂ Content:	
70% or more	\$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton	
Old range, bessemer	\$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.65
High phosphorus	5.55
Prices quoted retroactive to Jan. 1, 1947.	

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28 1/2¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31 1/2¢
Copper, reduced, 150 and 200 mesh	29¢ to 30 1/2¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 15¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 31¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 28¢
Antimony, 100 mesh	26.05¢
Cadmium, 100 mesh	\$2.00
Chromium, 100 mesh and finer	\$1.025
Lead, 100, 200, & 300 mesh 18.50¢ to 23.50¢	
Manganese, minus 325 mesh and coarser	49¢
Nickel, 150 mesh	51 1/2¢
Silicon, 100 mesh	28¢
Solder powder, 100 mesh 8 1/2¢ plus metal	
Stainless steel, 302, minus 100 mesh	76¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	\$2.65
Under 100 lb	\$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	\$11.50 to \$12.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.00 to 14.50
Foundry, Byproduct	
Chicago, del'd	\$17.10
Chicago, f.o.b.	16.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, f.o.b.	15.50
Swedeland, Pa., f.o.b.	15.50
Buffalo, del'd	17.25
Ashland, Ohio, f.o.b.	14.50
Painesville, Ohio, f.o.b.	14.60
Erle, del'd	16.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	15.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Ohio	\$64.00
First quality, Pa., Md., Ky., Mo.	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo.	64.00
Sec. quality, New Jersey	59.00
Sec. quality, Ohio	58.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	\$70.00
Chicago District	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick

Per Net Ton	
Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$59.00

Magnesite Brick

Standard, Balt. and Chester	\$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. Billmeyer, Pa., Millersville, Ohio	10.80
Midwest, add 10¢; Mo. Valley, add 20¢	

PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As-rolled	Hot-Rolled A 4140-50 Ann.	Cold-Drawn A 4615 As-rolled	Cold-Drawn A 4140-50 Ann.
Philadelphia	\$3.59	\$5.18	\$5.29	\$4.43	\$5.28	\$4.44	\$4.22	\$4.48	\$5.13	\$8.37	\$8.37	\$9.88	\$9.88
New York	4.37	5.32 ¹	5.47	4.67	5.45	4.72	4.42	4.82	5.17	8.42	8.42	9.92	9.92
Boston	4.40	5.22	4.95 ¹	4.65	6.36	4.70	4.47	4.82	5.22	8.62	8.62	9.97	9.97
Baltimore	3.89		5.14	4.40		4.39	4.34	4.45	5.10				
North	4.15					4.50	4.50	4.75	5.50				
Chicago	3.65			4.05	5.05	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Milwaukee	4.099	4.899 ¹	5.249	4.199		4.399	4.249	4.249	4.899	8.399	8.399	9.649	9.649
Cleveland	3.95	4.55	5.238	4.188	5.00	4.251	4.311	4.10	4.75	8.358	8.358	9.35	9.35
Buffalo	4.15	4.85 ¹	5.35	4.30	5.25	4.55	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Detroit	4.05	4.85	5.42	4.34	5.24	4.491	4.42	4.20	4.87	8.51	8.51	9.74	9.74
Cincinnati	3.916	4.716	5.168			4.553	4.444	4.403	5.083				
St. Louis	3.999	4.799 ¹	5.424	4.199	5.424	4.399	4.249	4.249	5.074	8.574	8.574	9.824	9.824
Pittsburgh	3.95	4.85 ¹	5.10	4.05	4.95	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
St. Paul	4.294 ⁷	5.094 ¹	5.434 ²	4.384 ⁷		4.584 ⁷	4.434 ⁷	4.434 ⁷	5.478 ⁶		7.084 ⁶		
Omaha	4.768	5.118 ¹	5.918	4.868		5.068	4.918	4.918	5.588				
Indianapolis	3.84	4.84	5.29	4.24	5.01	4.51	4.36	4.58	5.01				
Birmingham	4.15 ¹¹	5.53 ¹¹	5.67	4.72 ¹¹		4.38 ¹¹	4.10 ¹¹	4.10 ¹¹	5.78				
Memphis	4.32 ¹¹	5.63 ¹¹		4.88 ¹¹		4.92 ¹¹	4.67 ¹¹	4.67 ¹¹	5.78				
New Orleans	*4.68 ¹¹	5.94 ¹		4.88 ¹¹		5.03 ¹¹	*4.73 ¹¹	*4.83 ¹¹	5.94 ⁶				
Los Angeles	5.15	7.00 ¹	8.70	5.65	8.35 ⁵	5.10	5.20	5.10	6.90 ¹⁴	10.15	9.35	11.05	11.05
San Francisco	4.70 ⁸	6.30 ⁸	6.45	5.20 ⁸		5.00 ⁸	4.90 ⁸	4.75 ⁸	7.00 ¹⁰				
Seattle	4.80 ⁴	6.75 ²	6.30	5.30 ⁴		5.15 ⁴	4.95 ⁴	5.00 ⁴	7.10 ¹⁴		9.50 ⁶		10.85 ⁴
Portland	5.00 ⁴		6.25	5.50 ⁴		5.25 ⁴	5.10 ⁴	5.10 ⁴	7.20		9.30 ⁶		
Salt Lake City	5.65		7.10	6.35		5.70	5.85	5.85	7.00				

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 999 lb; (5) 2000 lb and over; (6) 1000 lb

and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 48¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	
Birdsboro	40.00	40.50	41.00	41.50	45.00
Birmingham	32.88	33.38			
Buffalo	35.50	36.00	36.50		
Chicago	35.50	36.00	36.50	37.00	
Cleveland	35.50	36.00	36.50		
Duluth	38.00	38.50	37.00	37.50	
Erie	35.50	36.00	36.50	37.00	
Everett		45.00	45.50		
Granite City	38.00	38.50	37.00		
Neville Island	38.00	38.50	36.50	37.00	
Provo	34.00	34.50			
Sharpsville	38.00	38.50	38.50	37.00	
Steelton	37.00				42.00
Struthers, Ohio	38.50				
Swedeland	38.50	39.00	39.50	40.00	
Toledo	35.50	36.00	36.50	37.00	
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00
Youngstown	36.00	36.50	36.50	37.00	

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	\$0.50 Arb.		45.50	46.00		
Boston	Steelton	4.82					48.82
Brooklyn	Bethlehem	3.00	40.00	40.50	41.00	41.50	
Brooklyn	Birdsboro	3.50					48.50
Cincinnati	Birmingham	4.87	37.75	39.25			
Jersey City	Bethlehem	1.84	38.84	39.34	39.84	40.34	
Jersey City	Birdsboro	2.33					47.33
Los Angeles	Provo	5.94	39.94	41.44			
Mansfield	Cleveland-Toledo	2.33	37.83	39.33	39.83	39.33	
Philadelphia	Bethlehem	1.67	38.67	39.17	39.67	37.17	
Philadelphia	Swedeland	1.01	39.81	40.01	40.51	41.01	
Philadelphia	Birdsboro	1.49	41.49	41.99	42.49	42.99	48.49
Philadelphia	Steelton	2.15	39.15				44.15
San Francisco	Provo	5.94	39.94	40.44			
Seattle	Provo	5.94	39.94	40.44			
St. Louis	Granite City	0.75 Arb.	36.25	37.25	37.25		

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 33¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$45.50; f.o.b. Buffalo—\$46.75. Add \$1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct

or more P. Bessemer ferroaluminum prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous \$43.00 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, \$48.49. High phosphorous charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	\$135.00
Less ton lots (packed)	157.00
Delivered Pittsburgh	140.25
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.	
Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.	
Eastern Central Western	
Carload, bulk ... 7.00 7.25 7.80	
Ton lots	8.00 8.60 10.50
Less ton lots ... 8.40 9.00 10.90	

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn	19-21% Mn
	3% max. Si	3% max. Si
Carloads	\$43.00	\$44.00
F.o.b. Pittsburgh	47.00	48.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$64.00 f.o.b. Keokuk, Iowa; \$65.00 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern Central Western
96% Si, 2% Fe	16.50 17.85 19.60
97% Si, 1% Fe	16.00 18.25 20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern Central Western
Carload, bulk ... 4.25 4.50 4.70	
Ton lots	5.25 5.85 6.15
Less ton lots ... 5.65 6.25 6.55	

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern Central Western
25% Si	15.00 15.65 15.90
50% Si	7.80 8.30 8.50
75% Si	10.00 10.30 11.05
80-90% Si	11.30 11.60 12.35
90-95% Si	12.80 13.10 13.80

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern Central Western
0.06% C	23.00 23.40 24.00
0.10% C	22.50 22.90 23.50
0.15% C	22.00 22.40 23.00
0.20% C	21.75 22.15 22.25
0.50% C	21.50 21.90 22.00
1.00% C	21.00 21.40 21.50
2.00% C	20.50 20.90 21.00

65-69% Cr, 4-9% C	15.60 16.00 16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60 17.00 17.15

Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern Central Western
Carload, bulk ... 9.85 10.10 10.20	
Ton lots	10.75 11.65 12.25
Less ton lots .. 11.15 12.05 12.65	

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern Central Western
Carload	16.70 17.10 17.25
Ton lots	17.90 19.20 20.00
Less ton lots .. 18.60 19.90 20.70	

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern Central Western
Carload	21.00 21.40 21.50
Ton lots	22.35 23.00 24.20
Less ton lots .. 23.35 24.00 25.20	

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern Central Western
0.20% max. C	83.50 85.00 86.25
0.50% max. C	79.50 81.00 82.25
9.00% min. C	79.50 81.00 82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern Central Western
Carloads	14.00 14.50 16.55
Ton lots	16.10 16.85 19.00
Less ton lots .. 17.10 17.85 20.00	

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

	Eastern Central Western
16-20% Ca, 14-18% Mn, 53-59% Si	
Carloads	15.50 16.00 18.05
Ton lots	17.60 18.45 20.20
Less ton lots .. 18.60 19.45 21.20	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings Distilled
Ton lots	\$1.60 \$2.35 \$2.95
Less ton lots .. 1.95 2.70 3.75	

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 60-66% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern Central Western
Ton lots	16.00 17.10 19.05
Less ton lots .. 16.75 17.85 19.80	

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern Central Western
Ton lots	14.25 15.35 17.30
Less ton lots .. 15.00 16.10 18.05	

Other Ferroalloys

Ferrotungsten, standard, lump or ½ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed... \$2.25

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. Openhearth

Crucible

High speed steel (Primos)... \$2.90

Vanadium pentoxide, 88-92% V₂O₅ technical grade, contract basis, per pound contained V₂O₅

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots

Less ton lots

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti

Less ton lots

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti

Less ton lots

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton... \$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., \$3 unitage per gross ton... \$65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. Carload lots

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk

Alsilfer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload

Ton lots

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots

Ton lots

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboreon, 17-50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern Central Western

Less ton lots... \$1.30 \$1.3075 \$1.325

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots ... \$1.89 \$1.903 \$1.935

Less ton lots 2.01 2.023 2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots... \$2.10 \$2.1125 \$2.1445

Silicaz, contract basis, f.o.b. plant freight allowed, per pound. Carload lots

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1

No. 6

No. 79

Bortram, f.o.b. Niagara Falls

Ton lots, per pound

Less ton lots, per pound....

Carbotam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0% Al 1.0-2.0%.

Ton lots, per pound

Floor Space 90 Pct Reserved for Chicago Metals Exposition

Cleveland

• • • More than 90 pct of the 24,000 sq ft of available floor space in Chicago's International Amphitheatre have been reserved for the coming National Metal Exposition, Oct. 18-24, according to W. H. Eisenman, managing director of the event and secretary of the American Society for Metals.

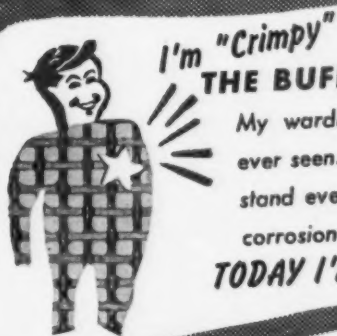
Some 277 industrial exhibitors have been assigned space in the industry's largest annual exposition. Floor plans had previously been sent only to former exhibitors in the metal show.

Other companies will receive floor plans on or about July 15. Because of the unprecedented demand for exhibit space in 1947, it is anticipated that the entire available area will be quickly reserved.

The October Metal Show will mark the first time that the national event has been held longer than 5 days. Former expositions have opened on Monday and closed on Friday night. The 1947 event, however, will be opened on Saturday Oct. 18, and continue until the following Friday night, adding 2 days to the show schedule.

Because Chicago is a major center of the metals industries, it is believed that attendance "by invitation only" on the first 2 days of the event will draw large numbers of interested engineers and technical personnel from the Chicago area. Since annual technical sessions of four major technological societies will open Oct. 20, Monday, it appears that most of the out-of-Chicago-area visitors will attend the exposition during the week of the technical sessions.

The National Metals Exposition, sponsored by the American Society for Metals, will be held concurrently with the National Metals Congress. In addition to the ASM, technical meetings during the week will be held by the American Industrial Radium and X-Ray Society, the American Welding Society, the Iron & Steel Div. and the Institute of Metals Div. of the American Institute of Mining & Metallurgical Engineers.



I'm "Crimpy"

THE BUFFALO WIRE CLOTH MAN!

My wardrobe is the most complete you've ever seen. I'm ready for any occasion, to withstand everything from ordinary wear to rust, corrosion and excessive heat.

TODAY I'M GALVANIZED AFTER WOVEN

COATED? EVERY BIT OF ME!

Know why? I'm hot dipped. But first I'm cleaned. Then, mind you, I'm pickled. Just try and work my coating loose!



AM I SMOOTH? AM I BRIGHT?

I'll say I am! I've just the right amount of zinc. Not too much. That would cause "points". Not too little. That would cause "pitting". Brother, I'm Controlled.



TAKE A LOOK AT MY NODES!

Ever see anything like them? Course not! They're sealed closed. Why, my joints are so smooth that one week I'm a tobacco apron and the next I'm a rayon conveyor.



LIKE MY SHAPE?

True and flat, isn't it? Stays that way, too! You don't see me buckling when I'm rolled out. Cut me into small pieces if you like. I'll still be square and rigid.



DON'T TAKE MY WORD

FOR ALL THIS — Write my manufacturer for **FREE FOLDER 597.**



A valuable piece of literature about the unusual strength, firmness and wearing qualities; smooth surface, faster screening and accurate mesh of "Buffalo" Galv. After Woven Wire Cloth.

Buffalo WIRE WORKS CO., INC.

Manufacturer of All Kinds of Wire Cloth Since 1869

456 TERRACE

BUFFALO 2, N. Y.

Technical Production Cost Savings Tapering Off in Recent Years

(CONTINUED FROM PAGE 101)

product in 1940 were 25 pct lower than in 1914 despite a 25 pct net rise in prices of iron, steel, and copper, indicating a more efficient use of materials through design changes and production improvements. From 1940-1944, material prices were nearly static due to price fixing by the government, but the material cost per unit produced rose 6.4 pct.

During the same period, total factory costs of the unit made at the test plant fell. Factory costs were \$3.88 per unit less at the end of 1940 than in 1914 and labor costs per unit fell \$1.09 from 1914 to 1940. There was little net change during World War II in the percentages of labor, material, and factory expense to the total factory cost. Heavy wartime overtime premiums inflated the factory expense, to which they were charged, but recent basic wage increases to offset loss of premium pay switched this portion of total factory cost from factory expense back to labor costs, restoring the normal proportions.

An analysis of the changes during different peak periods in total factory cost and its components, labor, factory, and materials costs, that occurred during selected years is shown in fig. 5. All sections of the chart show a steady reduction in costs from the peak of 1920, although, in general, the gains have become progressively smaller as the 1914 totals were approached and then reduced. The sharp inflation during and after World War I carried total factory cost to nearly double the prewar level, with the sharpest rise in material cost and the least in labor. By 1925, total factory cost had been reduced to about 50 pct over the 1914 level.

By 1930 total factory costs were only 6 pct over the 1914 level with material costs leading the decline. In 1937, total factory costs were 10 pct below 1914. From 1930 to 1937 the greatest change in costs was because of the drop in labor costs, which fell from 17 pct above 1914 levels to 10 pct below. When World War II production got underway in 1940, total factory costs



"We needed additional warehousing space—badly. First, we thought of adding a new wing. But the Crescent Electric PALLETIER gave us all the space we needed at far less cost. Vertical space—never before used. Now, tier after tier of our palletized materials are stacked to ceiling height."

The power-packed PALLETIER maneuvers easily in close quarters, climbs ramps, steps up loading and unloading. Just one man lifts, hauls, stacks—speedily, safely. Available in 1,000, 2,000, 3,000, 4,000 and 6,000 pound capacities. Write for free bulletins today.

CRESCENT TRUCK COMPANY

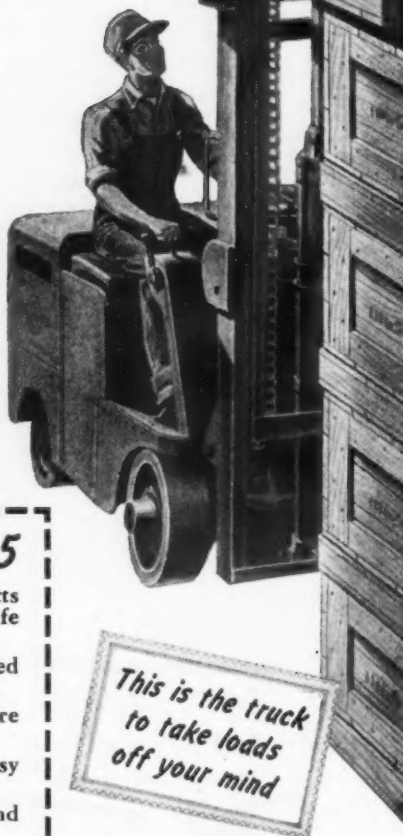
1105 Willow Street

Lebanon, Pa.

Industrial Truck and Tractor Specialists Since 1917

ONLY Crescent HAS ALL 5

- Full Magnetic Contactor Control protects against forced acceleration—extends life of motor and tires.
- Complete Stability with load fully elevated and tilted forward.
- Battery Power eliminates fumes and fire hazard.
- Full Accessibility to all mechanisms for easy inspection and maintenance.
- Maximum Visibility — operator spots and tiers without stirring from seat.



This is the truck
to take loads
off your mind

Crescent

ELECTRIC

PALLETIER

REG. U. S. PAT. OFF.

The *SIDE* of a V-BELT

is the *ONLY* Part that
Even Touches the Pulley

Naturally, it *GETS* the *WEAR!*

The moment you look at a V-belt in its sheave, you see that the *sides* are the only part that ever *touch* the pulley. The *sides* do all the *gripping*—they get *all the wear* against the sheave groove wall. The *sides pick up* the load. They transmit that load to the belt as a whole. And then, once more, the *sides*—and the *sides alone*—take hold of the driven pulley and deliver the power to it.

No wonder you have always noticed that the sidewall of the ordinary V-Belt is the part that *wears out first*.



Diagram of V-Belt
in Sheave Groove



The
CONCAVE SIDE
is a **GATES PATENT**

Straight Sided
V-Belt



How Straight Sided
V-Belt Bulges
When Bending Around
Its Pulley

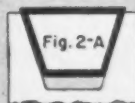


You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt
with Patented
Concave Sidewall



Showing How Concave
Side of Gates V-Belt
Straightens to Make Perfect
Fit in Sheave Groove
When Belt Is Bending
Over Pulley.



No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt.

477

Now See How the *Patented* **CONCAVE SIDE**

***REDUCES** Sidewall Wear— *Lengthens Belt Life!*

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

*More Important NOW That Gates SUPER V-Belts are Available

Now that Gates *SPECIALIZED* Research has resulted in Super V-Belts capable of carrying much heavier loads—up to *40% higher horse-power ratings* in some cases—the sidewall of the belt is called upon to do *even more work* in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important *NOW* than ever before!

THE GATES RUBBER COMPANY

DENVER, U. S. A.

"World's Largest Maker of V-Belts"

GATES VULCO ROPE DRIVES

Engineering Offices
and Jobber Stocks

IN ALL INDUSTRIAL CENTERS

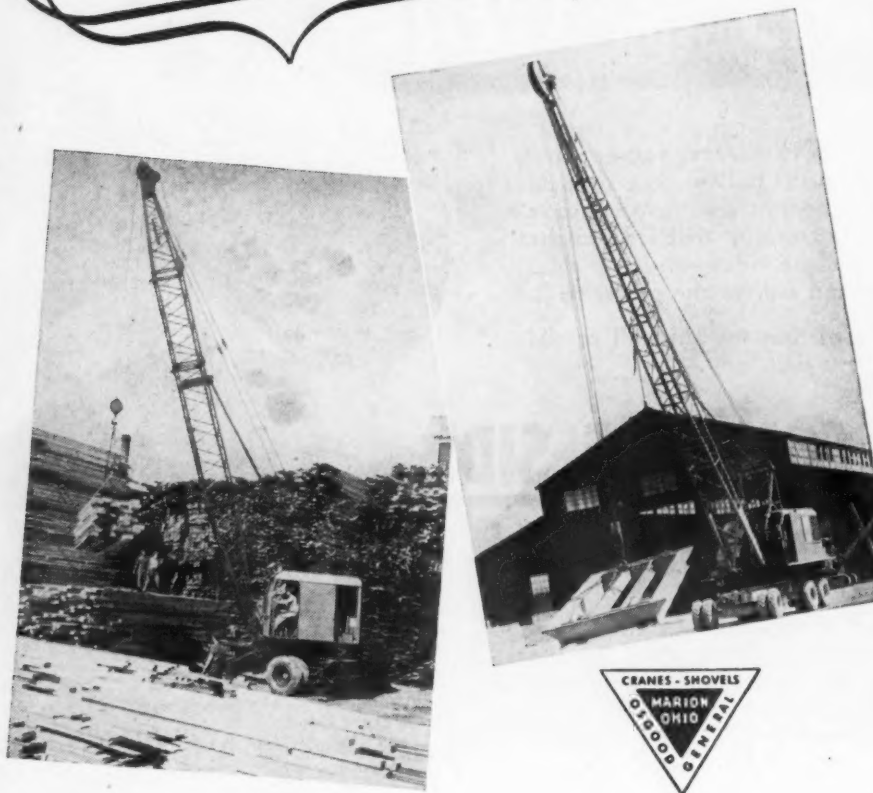
of the U. S. and
71 Foreign Countries



THE MARK OF
SPECIALIZED RESEARCH

Materials Handling

GOVERNS THE SPEED OF PRODUCTION



MODERN PRODUCTION MACHINERY and highly skilled workmen cannot operate at peak efficiency without an adequate, uninterrupted supply of materials. Handling, accounting for nearly $\frac{1}{4}$ of the total production cost, can, if inefficient, effectively retard the rate of production.

OSGOOD MOBILCRANES and GENERAL SUPERCANES, designed to provide maximum efficiency in handling heavy materials, today furnish the swift, economical movement of materials that insures capacity production from men and ma-

chines in many leading industrial plants. Compact and maneuverable . . . MOBILCRANES and SUPERCANES operate efficiently in close quarters; require no special tracks or runways and are easy on floors, thanks to their rubber tires. One-engine operated, one-man controlled, for safe, precise operation that saves time, money and manpower.

See your nearest OSGOOD-GENERAL distributor or write for complete details about swift, economical and safe handling of materials with MOBILCRANES and SUPERCANES!

ONE-MAN CONTROLLED • ONE-ENGINE OPERATED • RUBBER-TIRED

THE **OSGOOD** CO. **MOBILCRANES**

THE **GENERAL** EXCAVATOR CO. **SUPERCANES**

MARION, OHIO

NEWS OF INDUSTRY

were 12 pct below those in 1914; 2 pct below those of 1937; and about 25 pct above those of 1932-1933.

The net sales price per unit shows wide fluctuations over the period under examination because of competition, peak demand periods, low production, the depression, and other factors. The term "net sales price" as used here represents the list price of the item less the established discounts including trade, volume and prompt payment discounts at the rates prevailing at the time of sale.

World War I inflation raised the net price of the unit from \$53 to \$101 by 1920, a rise that was almost retraced by 1923, as shown in fig. 6. From 1923 to 1925, the price decline continued in the face of rising costs, with the result that the spread between net price and total factory cost in 1925 had shrunk to \$5 per unit. While the price decline continued into 1927 to a level 10 pct lower than in 1914, a rapid series of cost reductions more than offset the lower prices and the spread increased. Since July 1928, it has never been less than \$21.40 per unit.

By late 1929, the net price of the unit was \$54.40, against \$54.50 in early 1914 but in April 1930, it dropped to \$52.80 against \$53.00 in late 1914. The price never dropped lower than \$52.80 from 1930, until 1944.

In June 1944, as shown in fig. 7, the price was reduced to \$49.80, the reduction being initiated by the leading producer of the product to reduce profits subject to contract renegotiation by the government. This price, the lowest charged since mid-1927, is only 80¢ over the 30-year low of \$49.00 prevailing through the first half of 1927.

Against this price, factory costs tended slowly but steadily upward since 1940, with the 1944 average about 11.4 pct over that of 1940 and nearly double the cost between 1914 and 1920. The result of the squeeze between lower price and higher manufacturing costs has been to reduce the spread for other expenses and profits to the lowest point since 1928. Factory costs in 1944 represented 65.4 pct of the net sales price, against 55 pct in 1940, and a normal figure of 60 pct. Restoration of the 1940



MOLYBDENUM helps to make GOOD FARM EQUIPMENT

AGRICULTURAL EQUIPMENT, meeting more and more severe requirements, makes larger and larger use of alloy steels and irons. And among alloying elements none has grown more in post-war favor than Molybdenum.

The reason is easily stated. Molybdenum makes irons and steels more workable for the fabricator and more serviceable for the user.

What is true for agricultural implements is true of other machinery. Potent in effect and therefore economical, adding little to weight, easy for the steel-maker or the foundryman to incorporate in his product, Molybdenum improves machinability, strength—especially high-temperature strength,—rust resistance, corrosion resistance, wear resistance. It is an intensifier, not an inhibitor, of other alloying agents in producing these desirable changes. Among approved applications are those in blades and other cutting parts, punches and dies, gears, crank shafts, piston

rings, brake drums, valves, exhaust manifolds, tubing, bolts and rivets, welding rods and coatings.

Inquiries concerning any use of Molybdenum, Tungsten, or Boron will be gladly welcomed by the Molybdenum Corporation.



AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Mfg. Co., Inc., Union City, N.J.

Works: Washington, Pa.; York, Pa.

Mines: Questa, New Mexico; Urad, Colorado.

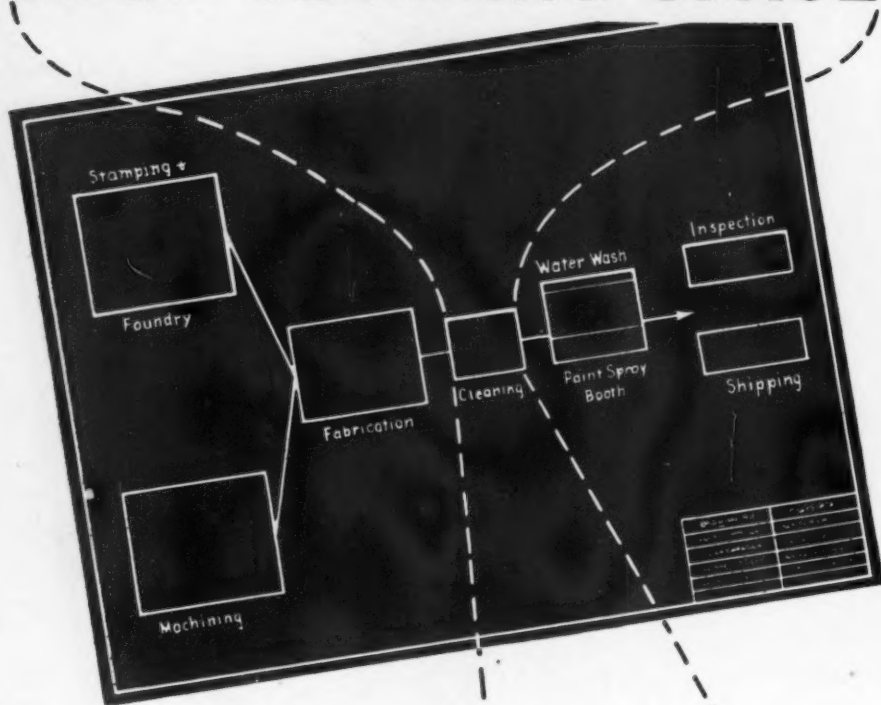
MOLYBDENUM

CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.



THE IRON AGE, July 31, 1947—121

YOUR CLEANING SPACE



Will more than

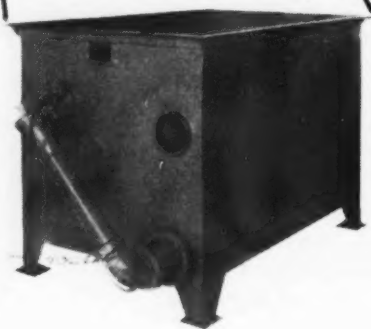
Pay Off

—when you install cleaning materials and methods tailored to metal finishing problems. Detrex products can help you.

Detrex Triad Emulsions

Wet out soil quickly
Do not attack metal
Rinse freely in water
Eliminate fire hazards
Protect work from rust

Call the Detrex field representative nearest you for more information on these products.



Detrex All-Purpose Tanks are heated by steam or gas. Available in standard sizes, they are ideally suited to cleaning departments requiring ready-built installations.

NEWS OF INDUSTRY

price would produce a ratio of 61.2 pct.

Thus, it can be seen that the selling price of this commodity, which is widely used, has remained fairly stable since 1914 and reductions in factory expenses and material costs have been made, but increases in earned labor rates have offset them. In other words, the savings from advances in design and production have been passed in total to the worker, with the buyer not benefiting in any major price reduction but only in a better product. While this is desirable, as the demands by labor continue upward new methods of reducing costs must be forthcoming or the price of the product will have to reflect these demands. The latter situation if it is general leaves the worker in no better relative position.

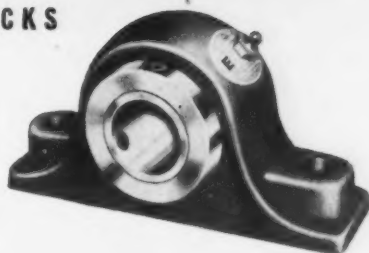
Manufacturers today are looking for ways of cutting costs. They are examining four phases: (1) Product design, (2) Production techniques, (3) Materials handling and product handling techniques, (4) Distribution methods.

The first three are interrelated since they apply to the product in its production stage. Many manufacturers are closely examining materials handling, feeling that this has been neglected in the past when production methods and the product were streamlined. The trend toward less handling by employees, automatic stationing of components, conveyerized movement of parts and products is a dominant one.

Reduced distribution costs are also an aim of industrialists. Many have indicated that this affords probably the greatest opportunity for cost savings. Better knowledge of potential selling areas through market research departments is being attempted by many companies. Decentralization of manufacturing sites by automobile, electrical and other industries is another attempt to reduce distribution costs. Manufacturers realize that design and production cost savings are getting harder to achieve, and new fields in which to reduce costs must be forthcoming.

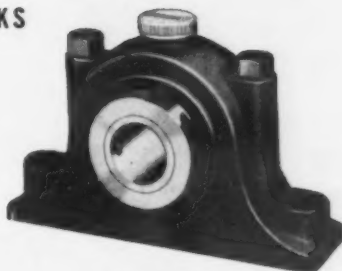


DODGE-TIMKEN TYPE "E" PILLOW BLOCKS



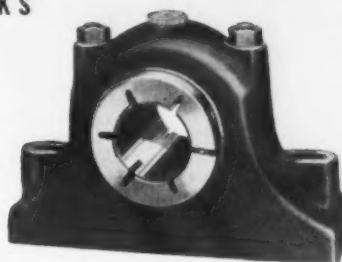
Superior performance at moderate cost. High speed capacity. Sizes 1-3/16" to 4".

DODGE-TIMKEN DOUBLE INTER-LOCK PILLOW BLOCKS



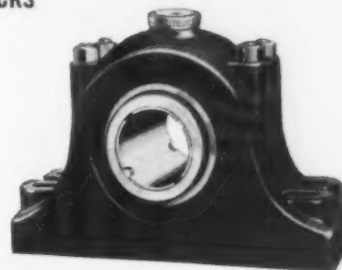
For general service. Normal radial, thrust and shock loads. 1-7/16" to 4-15/16".

DODGE-TIMKEN TYPE "C" PILLOW BLOCKS



Triple sealed against fine abrasive dust. Shaft sizes are 1-3/16" to 4-15/16".

DODGE-TIMKEN SPECIAL DUTY BALL AND SOCKET PILLOW BLOCKS



Rugged, heavy duty, high speeds. Made in shaft sizes from 1-7/16" to 8".

*For
Unquestioned Quality-*

DODGE-TIMKEN

On anti-friction bearings, these two names are assurance of dependability and performance which enable you to cut costs and increase production. Dodge mounts, seals and houses the precision bearing assemblies and delivers them fully assembled, adjusted and lubricated—ready to lock on the shaft. Parts required for mounting these bearings are manufactured complete in the Dodge factory—from foundry through many precision operations on the latest machine tool equipment. The bearings pictured are from the famous Dodge 30,000 hour line, covering a broad range of industrial bearing requirements, promptly available from distributors' stocks.

DODGE MANUFACTURING CORPORATION • MISHAWAKA, INDIANA



CALL THE TRANSMISSIONEER

your local Dodge distributor, for news of latest developments in power transmission equipment. Look for his name in your classified telephone book under "Power Transmission Equipment."

DODGE
of Mishawaka, Ind.

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NAME PLATE

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

Weekly Gallup Polls

(CONTINUED FROM PAGE 97)

"Would you favor or oppose giving European countries credit of about \$5 billion a year so that they could buy the things they need in this country?"

	Pct
Favor	55
Oppose	35
No opinion	10

"Would you be willing to pay more taxes, if necessary, to raise this money?"

	Pct
Yes, would be willing	41
No, would not	50
No opinion	9

More than seven out of every ten voters polled in France and Holland by the French and Dutch Gallup Polls have heard about the Marshall Plan, as compared to 49 pct of America's voters.

French support for the plan is overwhelming among those expressing an opinion.

"Do you think that France should go along with the plan?"

	Pct
Yes	47
No	6
No opinion	47

In Holland, when voters familiar with the plan were asked whether Holland ought to cooperate the votes were as follows:

	Pct
Yes, cooperate	75
No	16
No opinion	9

Chief opposition to the plan was expressed by Dutch Communist voters polled.

Blaw-Knox Net Profits Up

Pittsburgh

• • • Blaw-Knox Co. reported net profits for the first 6 months of 1947 of \$1,382,283, as compared with \$1,054,064, in the same period of 1946. Shipments and billings for the first six months this year were \$25,682,668 and unfilled orders as of June 30 were approximately \$28,000,000.

The company announced that during the second quarter it had completed renegotiation of war contracts for 1945 by payment to the government of \$3,254,798. This concludes all adjustments of war contracts.



This **EUCLID CLAIM** is substantiated by successive repeat orders for Euclid Cranes from steel plants, automotive factories and rolling mills which include an impressive list of the big leaders in the heavy industries.

THE EUCLID CRANE & HOIST COMPANY
1361 CHARDON ROAD, EUCLID, OHIO

WRITE FOR
YOUR COPY OF
THE LATEST
CRANE CATALOG



YOUR NAME'S IN THE POT

When you order STRENES METAL dies from us, they are distinctively yours in metallurgical structure.

By varying cupola changes, we are able to give each batch of STRENES METAL special characteristics in respect to hardness, toughness, density, temperability, acid resistance, magnetic qualities, etc. Knowing the drawing and forming problem, we mix the ingredients of STRENES

METAL to meet the requirements.

This explains why STRENES METAL dies deliver an extraordinary number of stampings between redressings, thereby greatly cutting maintenance and production costs.

It will pay you to find out how the advantages of STRENES METAL dies are applicable to your drawing and forming operations. Ask us for specific information.

THE ADVANCE FOUNDRY CO.
SEMINARY AVE., DAYTON 3, OHIO

STRENES METAL
DRAWING AND FORMING DIES

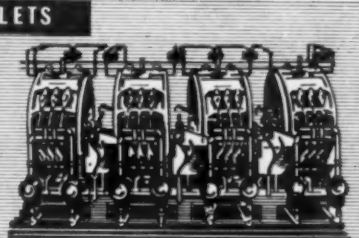
New factor in management's
big job of lowering production costs

SELAS CORPORATION'S

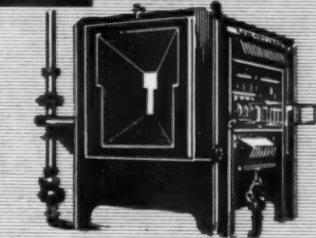
Gradiation

PROCESS

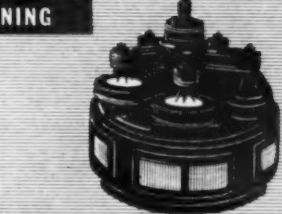
BARS, TUBES, BILLETS



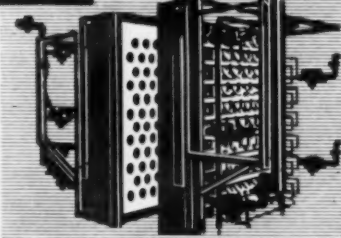
HEATING FOR FORGING



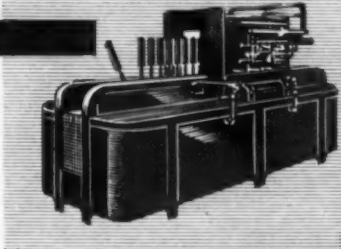
SELECTIVE HARDENING



STRIP HEATING



BRAZING



— provides metal industry new standards
for heat-processing results

— distinguishes new techniques and equip-
ment from traditional gas-heating methods

GRADIATION changes the ability of com-
mercial gas fuels to serve industry. For speed,
product improvement, exact reproduction
of heating effects, automatic handling of work
and ease of control, industry has new aid.
Integration of heat-processes with plant oper-
ations is improved and, as direct result,
substantial benefits in operating costs accrue.

Results are actual and can be measured.
Engineers of Selas Corporation developed
GRADIATION and then put it in use in plants
and mills whose work with metals represents
a cross-section of heating requirements.
Installations and their results are the creden-
tials with which GRADIATION—a distinct,
new method—comes before industry.

Technically, the name GRADIATION implies *radi-
ation*—high speed, high temperature, solar-like heat;
it implies *gradient*—faster heating by exposing materials
to superheat with precise control of heating rate;
it implies *gas-radiation*—which protects the charge
and is economical to apply.

Data from installations of the GRADIATION method
are available to metal producing and metal working
industries and to gas companies through Selas repre-
sentatives or from Selas headquarters.

SELAS CORPORATION OF AMERICA PHILA 34 PA

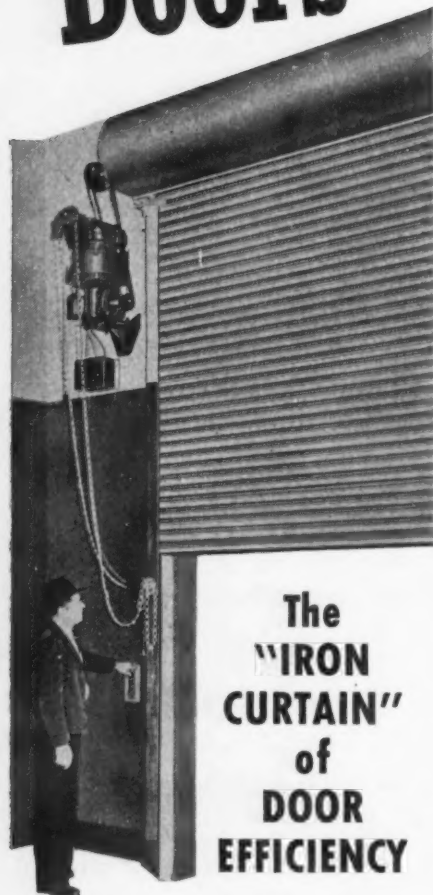
GRADIATION IS A



SELAS TRADE NAME

CONSULTING AND MANUFACTURING GAS ENGINEERS

Kinnear Rolling Doors



The rugged, all-steel, interlocking-slat curtain of Kinnear Rolling Doors is the key to extra years of door efficiency and protection—at lower cost. Its famous coiling upward action saves time, permits full use of all adjacent floor and wall space, opens out of the way of damage by wind or vehicles. In every way, you get more efficiency per square foot of opening with Kinnear Rolling Doors. Write for catalog.

The KINNEAR Manufacturing Co.

Factories:
1780-80 Fields Ave. • Columbus 16, Ohio
1742 Yosemite Ave. • San Francisco 24, Calif.

Offices and Agents in all Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

126—THE IRON AGE, July 31, 1947

NEWS OF INDUSTRY

Commerce Reports On Tests Made on Steel Ship Plates and Tubes

Washington

• • • Transition temperature of steel plates—the temperature at which the mode of failure changes from a ductile, shear type to a brittle, cleavage type—may vary from freezing to well above room temperature according to the results of a series of tests to determine causes of cleavage fractures in ship plates. Three reports on the tests are now on sale by the Office of Technical Services, Dept. of Commerce.

The reports summarize the results of research conducted on steel ship plates and tubes at the University of California for the Office of Scientific Research and Development and the U. S. Navy.

The principal materials used in the tests were three lots of semi-killed, hull quality steels. Two of these steels were of medium carbon and manganese content, tested in "as-rolled" condition, while the third was of somewhat lower carbon and higher manganese content and was tested in the as-rolled condition and also after having received a normalizing treatment.

The specimens used in the principal program were $\frac{3}{4}$ in. plates containing a narrow transverse slot having a length equal to one fourth of the specimen width. These were tested in tension in widths ranging from 12 to 108 in., and observations were made of the maximum load, load at development of cracks, fracture load, energy absorbed to maximum load, mode of fracture, strain distribution over the faces of plates and thickness reductions near the lines of fracture.

Results from the tests of two lots of steel of essentially the same chemical composition except for nitrogen content revealed that the steel with the higher nitrogen content had a considerably higher transition temperature. The microstructure of the steel with the higher transition temperatures was also considerably coarser. No appreciable difference in transition temperatures was found when one lot of steel was tested in the as-rolled and in the normalized conditions.

Improved metallurgical structure of another lot of steel, accomplished by requeenching and redrawing at a lower temperature resulted in lowering of the transition temperature and an increase in the ability to absorb energy.

One of the reports describes experimental work and results of tests on twelve $\frac{5}{8}$ -in. diameter thin-walled tubes of aluminum-deoxidized steel subjected to various conditions of biaxial stress. These experiments comprised the "pilot" series of tests in the larger investigation on the behavior of ship plates summarized in the final report.

The reports are illustrated with pictures of test equipment and specimens showing failure encountered in the tests. Tables summarize the test data and properties of specimens.

The reports are: PB-20226; Behavior of Steel Under Conditions of Multiaxial Stresses and Effect of Welding and Temperature on This Behavior, 77 p., photos, drawings, diagrams, graphs; microfilm, \$1, photostat, \$6; PB-39555, Causes of Cleavage Fracture in Ship Plate; Flat Plate Tests, 182 p., graphs, photos, tables; microfilm, \$4; photostat, \$13; and PB-61048, Causes of Cleavage Fracture in Ship Plate; Flat Plate Tests and Additional Tests on Large Tubes; 192 p., photos, graphs, tables; microfilm, \$4; photostat, \$13.

Orders for the report should be addressed to the Office of Technical Services, Dept. of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Mullins Profit Up

Salem, Ohio

• • • Mullins Mfg. Corp. reports net profit for 6 months ended June 30 rose to \$2,324,581, equal to \$4.07 a share on common stock, from \$20,844, or 72¢ a common share, in the first half of 1946.

During the six months ended June 30, 1946, the company's operations were curtailed due to the work stoppage caused by strikes and shortages of steel, shipping crates, railroad cars and gas.

DEPENDABLE POWER



CRESCENT PALLETIER FORK TRUCK



EXIDE-IRONCLAD POWER AND BATTERY ELECTRIC TRUCKS

**Keep materials moving steadily,
safely, at minimum cost**

You can make substantial savings in materials handling costs by using the modern, efficient method employed by so many others throughout your industry. They have delegated their loading, unloading, lifting, hauling, placing and stacking to the time-and-cost-cutting team—battery electric trucks and Exide-Ironclad Batteries.

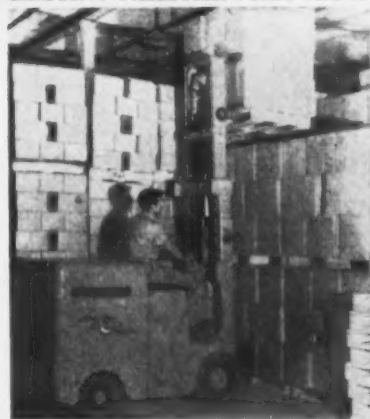
Exide-Ironclad Batteries have the high power ability, the high maintained voltage and the high capacity that materials handling requires. You can always count on Exide-Ironclad Batteries for dependability, long-life and ease of maintenance.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

CRESCENT PALLETIER FORK TRUCK



PORTRAIT OF A



who is pleased
 with the service
 rendered on his
 orders for
**SCREW
 MACHINE
 PRODUCTS**
 made
**FASTER
 and
 BETTER**
 for
LESS
by

U.S. AUTOMATIC
CORPORATION
Screw Machine Products
AMHERST OHIO

CHICAGO
 DETROIT
 INDIANAPOLIS



NEW YORK
 PITTSBURGH
 PHILADELPHIA

Fatigue Cracks

BY C. T. POST

Ridiculous to Sublime

•• During all the years we knew of Joe Linney as a technical sage among our experts, we thought that here was one man really tailored to his life's calling. Now that Republic Steel's Adirondack expert has turned to writing novels, we're not so sure he was cut out for mining after all. We can recommend his latest tale, *The Touch of Human Hands*, without hesitation—particularly p. 365, which goes like this:

"As she climbed into bed, she told him her name was Nancy something or other. What a passionate little devil she was, with her moist lips and the exotic musky fragrance that emanated from her smooth blonde hair . . . The train clicked and roared over the rails toward Albany. He opened his brief case, took out a copy of *THE IRON AGE* and, with the exception of glancing out the window at an occasional boat on the Hudson, he read for a long time . . ."

Sleepy yet?

Uplift

•• One of these days we're going to turn from the sordid paths of modern day business to rest our head on the isocolean bosom of the Geometric Tool Co., New Haven, Conn. The spirit of Dorothy Dix hovers over their booklet which says, "A warm welcome awaits you here. We want you to feel that you can bring to us your problems, your suggestions, and your ideals." The only problem we have right now which might interest them is that hangover from Geometry 1A—something about the square of the base plus the square of the altitude. But one of these warm summer days we could stretch out there at the foot of New Haven's West Rock and go on for hours about our ideals.

African Industrial Threat

•• Some advertisers, we are told get conniptions if their enticing copy for widgets or whatever fails to bring a flood of panting inquiries in the next mail. Every time a boat comes in from British West Africa we chuckle again at such hucksterisms. Without fail, a mail sack is dumped on the desk, spewing forth impressive letters postmarked "Lagos." All of them are encomiums for "the best magazine in the U.S.A.," and all prom-

ise subscriptions or advertising if only we'll send a sample copy.

Once, when we were young and naive, we puffed up and sent out the samples. Next thing we knew, advertisers in your f.f.j were getting full mail bags from Lagos, too, requesting catalogs, terms, prices. One machine tool builder, before sending a sales engineer, checked with the U.S. consul. He was informed that Lagos industry was confined primarily to leopard skins, but that the town boasted a first rate American missionary school. The head missionary, a great admirer of American industrial literature as an educational force, it seems, felt that actual practice was the best way to learn business letter writing.

If your customers are passing you by, and you need inquiries quick, let us know. The boat from Lagos came in yesterday, and we can't see the top of our desk.

Home Sweet Home

•• Used to be a day, when the "For Rent" signs gathered moss, that nothing less than birth or marriage rated an announcement card. In yesterday's mail came this formal inscription from Ed Logelin, U.S. Steel's chief Chicago horn blower:

DISPLACED PERSONS FIND HOME!

At long last, after bouncing around in hotels for six months, the Logelins have settled, bag and baggage, at 156 Herrick Road, Riverside, Illinois.

Eleanor and Ed Logelin

Telephone: Riverside 6378

War Surplus

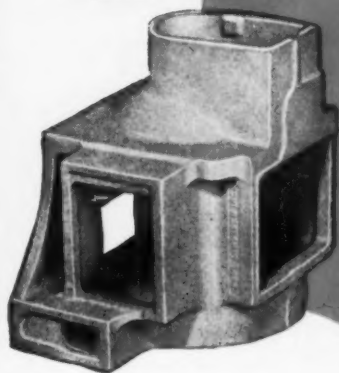
•• Bill Hoffman, who keeps the Ohio subscribers happy, sends a clipping from Cincinnati showing long lines of weary machine tool buyers' dead on their feet after waiting for three days and nights outside a former aircraft engine plant to get first crack at the government's sale of surplus machine tools.

The incident illustrates perfectly what we mean about lack of imagination in government. If the WAA had really been on its toes, that would have been the perfect place to unload surplus army cots and blankets. At good prices, too.



PERMITE Permanent Mold

ALUMINUM CASTINGS



Help keep labor costs DOWN!

Clean, sleek castings — often requiring no machining operations, and never more than a minimum . . . Castings made to tolerances as close as $\pm .010''$. . . Castings of finer grain structures, greater strength and hardness, consistent uniformity.

Such are aluminum alloy castings made by the Permited Permanent Mold process. They're advanced, modern castings that step up profits by reducing finishing operations and helping hold labor costs to a minimum.

With Permited Castings you can machine the full run of a part well within the tolerance, without tool resetting. And the greater tensile strength of these "precision-made" castings frequently permits thinner cross-sections, reducing weight and cost.

It will pay you to investigate the cost-cutting possibilities of Permited Permanent Mold Aluminum Castings for your products. Submit blueprints for recommendations and quotations.



PERMITE

ALUMINUM INDUSTRIES, INC.

CINCINNATI 25, OHIO

DETROIT: 809 New Center Building. NEW YORK: 9 Rockefeller Plaza. CHICAGO: 64 E. Jackson Boulevard. ATLANTA: 413 Grant Building

ALUMINUM PERMANENT MOLD, SAND and DIE CASTINGS...HARDENED, GROUND and FORGED STEEL PARTS

*You'll find Thomastrip
in many a modern window*



STEEL VENETIAN BLINDS

● A majority of women prefer Venetian blinds for their windows, and the chances are they want blinds made of steel. *To meet this wide-spread demand, many discriminating manufacturers of high quality Venetian blinds use galvanized, bonderized steel slats made from ThomaStrip.*

why? . . . Because ThomaStrip's galvanized, bonderized coating protects steel against rust and corrosion. Because ThomaStrip's bonderizing process adds a special chemical coating that keeps paint from flaking or cracking. And with ThomaStrip's flexibility, steel slats bend easily for cleaning . . . stay good-looking in spite of long, hard use.

Our engineers will be glad to work with you on new product ideas . . . in redesigning for product improvement and cost reduction.

THE THOMAS STEEL COMPANY
Cold Rolled Strip Steel Specialists
WARREN, OHIO



Dear Editor:

LIGHT GAGE SHEETS

Sir:

We are repeatedly turned down on all previous sources for 26-gage cold-rolled sheets. Please enlighten us on this situation. Why isn't it available at some kind of price? Will we have to alter our product and scrap our dies or will it be back into supply again?

A STEEL BUYER

● As you are undoubtedly aware, light gage hot and cold-rolled steel sheets are among the most critically short metal products. It is impossible to predict how soon the current shortage in steel sheets may continue. The steel industry, as a whole, is operating at peak capacity and there are several large sheet production cold mills which are expected to begin operations in the next six or eight months. In most instances, the initial operation of these facilities has been delayed by strikes in supplementary equipment producing plants.—Ed

PENNSYLVANIA IRON MINES

Sir:

Could you kindly inform me whether there is a trade directory giving the names and addresses of operators of iron ore mines in Pennsylvania, those who operate as owners as well as those who operate as lessees. If there is no such publication perhaps you could suggest the most practical way of ascertaining the leading operators.

MARCEL A. VITI

Philadelphia

● There are only two iron ore mines operating in Pennsylvania. One is at Cornwall, Pa., operated by the Bethlehem Steel Co., Mr. A. F. Peterson, general manager; the other is the Hazard & Little Gap Mine, Carbon County, Pa., operated by the Prince Mfg. Co. Ore mined by this company is used in paint. Additional statistical information is available from the Bureau of Mines, Washington.—Ed.

TINNING CAST IRON

Sir:

In the Jan. 16 issue there appeared an article entitled, "Tinning Cast Iron." Will you be good enough to send me tear sheets of this article.

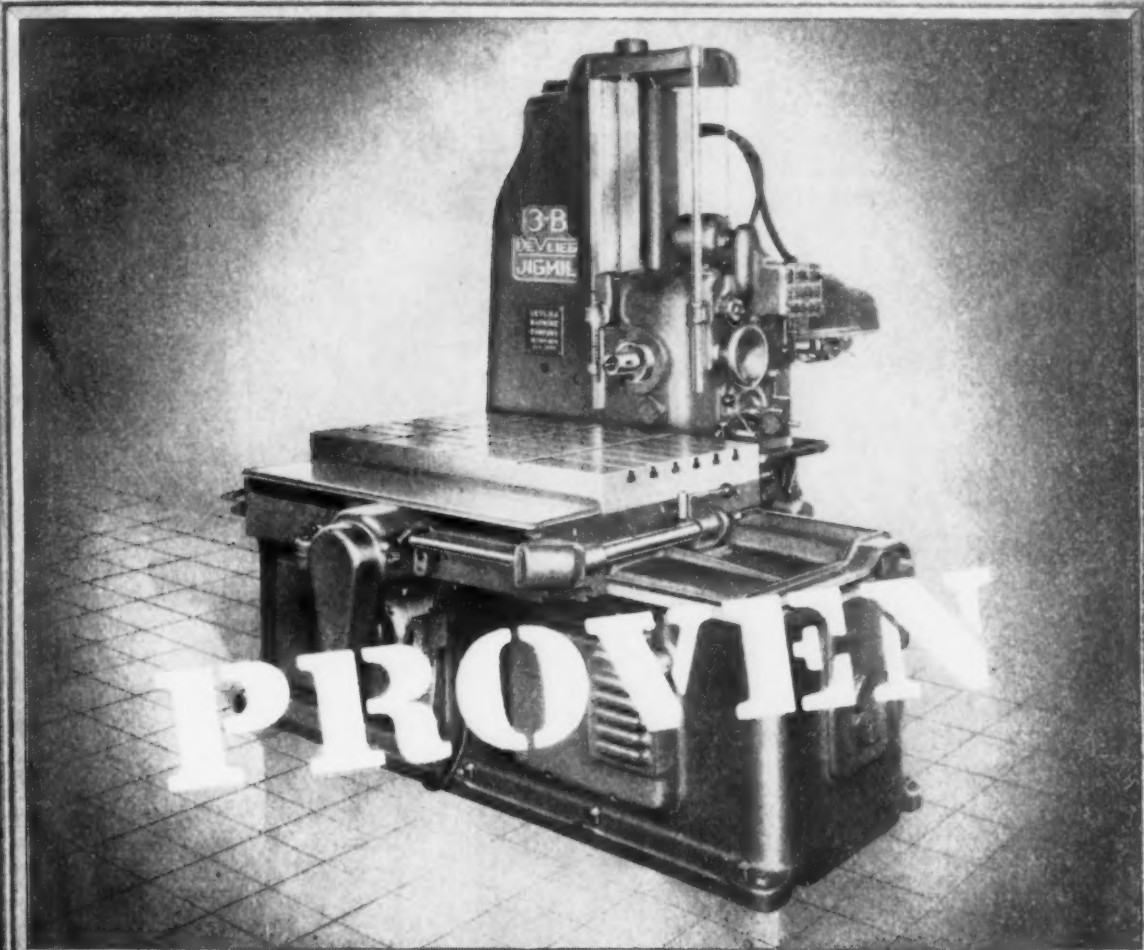
M. A. BUTLER
Secretary

Otto Elevator Co.
Yonkers, N. Y.

CONCENTRATING TABLES

Sir:

In the May 1 Newsfront we found a reference to the expanding use of concentrating tables in conjunction with flotation. After 16 yr we are carrying out a rather modest advertising campaign to draw attention to our Model 46 table which was designed in anticipation of the trend



The World's Finest Boring and Milling Machine

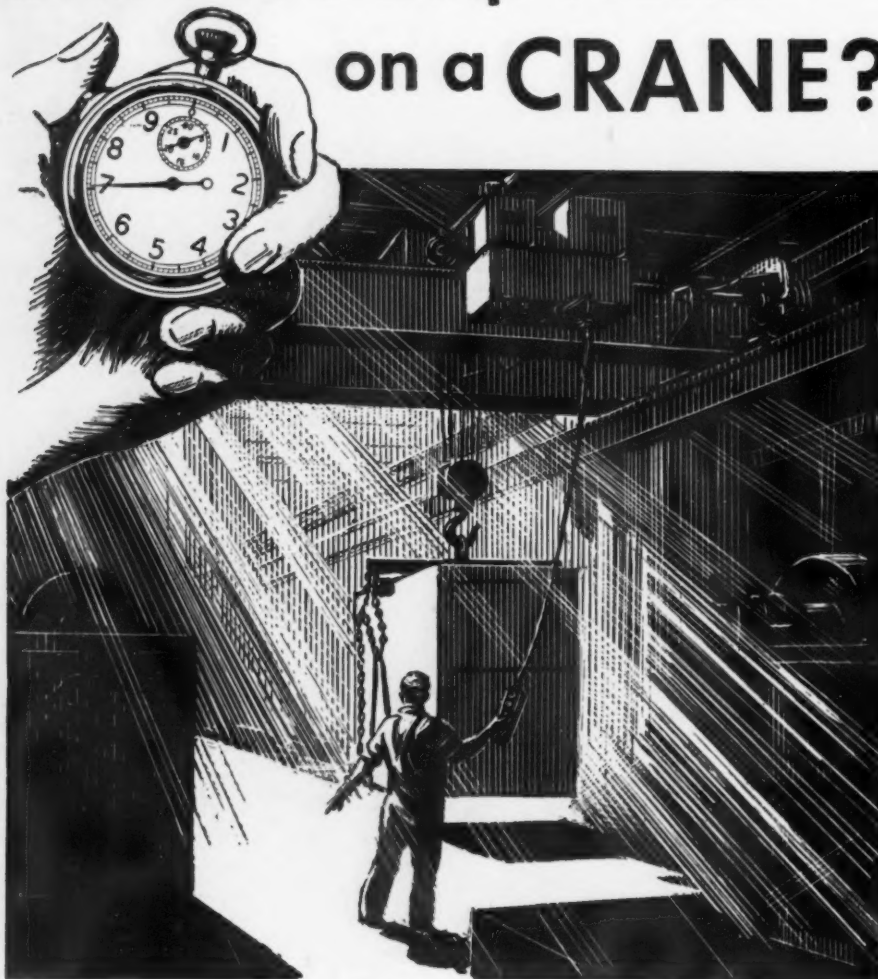
THIS new model 3-B JIGMIL has automatic power means to position the spindle from one location to another accurately to within much less than .0001 (one-ten thousandths part of an inch). Thus, extreme laboratory accuracy is conveniently available with ordinary skill that would normally make such precision very high in cost. This, and many other refinements, go further to prove that the JIGMIL Idea is a totally new approach to the problems of precision boring at a new low cost.

DEVLIEG MACHINE COMPANY



**450 FAIR AVE. FERNDALE 20,
(Detroit) MICH.**

Ever use a Stop Watch on a CRANE?

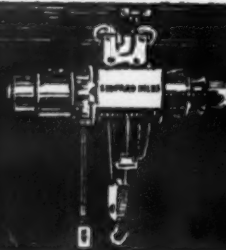


It isn't necessary to work in fractions of a second but it will pay you to check the time it takes to move heavy materials from one spot to another. No matter how efficient you are in operations involving manufacturing, processing or fabricating, there's bound to be a waste of time, money and manpower unless your handling costs are kept down.

Let trained, experienced Shepard Niles engineers assist you in making a study of your handling problems. Over a period of many years America's oldest builder of electric cranes and hoists has assembled data on the handling of materials in thousands of businesses. All this experience is available to you, without obligation, to help you select the crane best suited to do your job with ease, economy and efficiency.

Every hoist application is different. With a background of experience in installing electric hoists in every type of business, Shepard Niles can give you invaluable assistance in planning. This assistance is available without obligation.

Shepard Niles
CRANE & HOIST CORPORATION



356 SCHUYLER AVE. • MONTAUR FALLS, N. Y.

50—THE IRON AGE, August 7, 1947

noted in Newsfront. We would like permission to use, in full, this news item, as part of the message on a piece of direct mail advertising . . . giving credit to THE IRON AGE.

U. S. JAMES, JR.

James Equipment, Inc.
Newark, N. J.

● You have our permission.—Ed.

STRIPPING METALS

Sir:

Will you please send us a reprint of the article by J. B. Mohler entitled "Quick Guide to Solutions for Stripping Metal Overlays." This article appeared in the May 8 issue.

C. J. MANNEY

Development Dept.
Columbus McKinnon Chain Corp.
Tonawanda, N. Y.

CONVERTER BLOW

Sir:

Will you please send me tear sheets of "Spectrographic Control of the Converter Blow," which appeared in the May 29 issue.

PETER J. GRUSZECKI

Chief Spectrographer

Continental Motors Corp.
Muskegon, Mich.

IRON LUGS

Sir:

We are interested in securing iron lugs or buttons, which are simply punchings from iron. The purpose of obtaining material in this form is to provide as much exposed surface as possible to speed up the reaction with acid as used in some of our processes. The quantity of material required is in ton quantities, and the quality of material is of low manganese content. We understand that wrought iron is the most practical from which to obtain this material and we are writing to inquire if you can suggest a source of supply.

J. B. McABEE

Purchasing Agent

J. T. Baker Chemical Co.
Phillipsburg, N. J.

● Send full particulars of your iron punchings requirements to the companies whose names we are forwarding.—Ed.

BRASS AND STEEL TUBE

Sir:

Could you help me to find a supplier of brass plated steel tubes. The tubes are to be used as wardrobe hanger rods. Plain brass tubes with enough rigidity would be too expensive for this use and as far as I know brass clad steel tubes have been used all over the world for similar purposes. The tubes can be of the welded type. The only condition is that the brass surface is good enough for polishing.



KAYDON Radial Ball Bearings
15,000" x 19,000" x 2,000"
in Food Machinery
Corporation's New Juicer

KAYDON BEARINGS help SUPER JUICER squeeze 480 OPM*

*Oranges per minute

KAYDON Bearings play a very important part, say the designers, in this remarkable machine, so aptly christened the FMC SUPER JUICER. KAYDON precision radial bearings support the entire revolving head, including the actuating cam and upper cups of the squeezing mechanism, the head traveling smoothly, 24 revolutions per minute.

SUPER JUICER is right! Produces upwards of 300 gallons of juice per hour. It's super juice, too . . . tastes fresher, keeps better . . . since the juicing operation keeps the juice from the inside of the citrus fruits from mixing with the oil from the rind.

FMC engineers recognize the advantages of KAYDON precision bearings, just as designers of many other types of heavy-duty machinery do, in such widely varied fields as oil field machinery, rock-crushers, grinders, steel mills and paper mills, road equipment, excavators, hoists, bending machines and other heavy-duty equipment.

For sound bearing-cooperation, contact KAYDON.

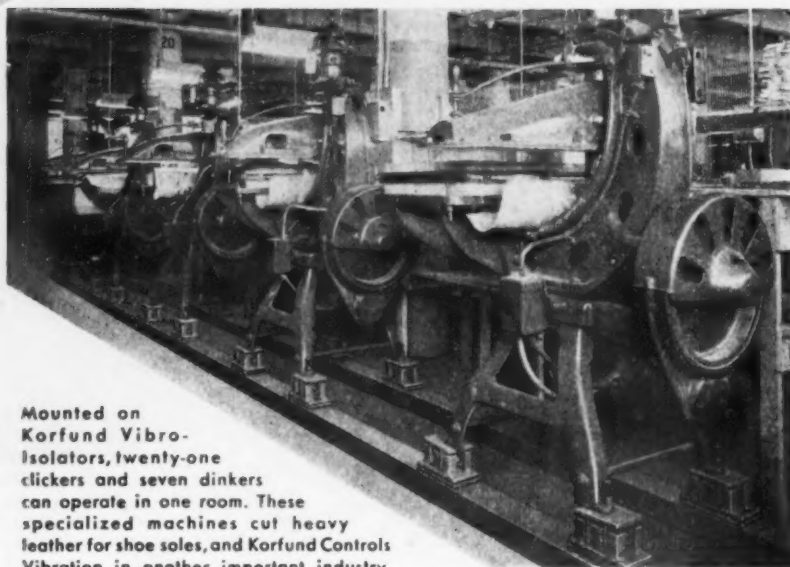
KAYDON Types of Standard or Special Bearings:

Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.
MUSKEGON • MICHIGAN

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

Increase PRODUCTION EFFICIENCY with **KORFUND** VIBRO-ISOLATORS



Mounted on Korfund Vibro-Isolators, twenty-one clickers and seven dinkers can operate in one room. These specialized machines cut heavy leather for shoe soles, and Korfund Controls Vibration in another important industry.

VIBRATION from any machinery in operation is a disturbance. Where machines are located close together, vibration transmitted along the line slows production, causes excessive machine wear, increases work rejections, and often damages the building structure.

Elimination of these troubles with Korfund Vibration Control Units results in more efficient production . . . less maintenance. In every industry, Korfund "Tailor Made" Vibro-Isolators, standard units developed in a complete range of sizes for impact and reciprocating machinery, are successfully controlling vibration.

Korfund offers you Engineered Vibration Control . . . over forty-five years of experience applied to your immediate problem. Write for bulletins giving complete information. "If it's a question of vibration, Korfund has the answer."

KORFUND

VIBRATION CONTROL

THE KORFUND COMPANY, Inc., 48-35 32nd ST., LONG ISLAND CITY 1, NEW YORK

I am interested in placing a first order for 100,000 to 300,000 ft of such tubes, external diam $\frac{3}{4}$ in. . .

O. H. C. MESSNER
Consulting Engineer

Feldbach
Zurich, Switzerland

● Use of the tube as outlined in your letter would indicate that a composite steel and brass tube is what you require. You may encounter difficulty in securing this material for export purposes, because of heavy demand in the U. S. However, write to the companies whose names we are forwarding.—Ed.

FIRE-PROOF LAC

Sir:

Can you tell me the names of manufacturers of fire-proof lac, which replaces the enamel for pots?

OSKAR GOLDSTEIN
Consulting Engineer

Tnava
Masarykova, Czechoslovakia

● Inquiries fail to disclose the existence of a fire-proof lac. However, there are heat resistant lacquers available that might serve your purpose. We suggest you send full particulars concerning the job you wish to do, to E. I. duPont de Nemours & Co., Wilmington, Del. If anyone can help you they surely will be able to.—Ed.

FINANCIAL ANALYSIS

Sir:

We would appreciate your forwarding three copies of the chart showing position and financial status of the leading 22 steel corporations in the country. The chart appeared in the Apr. 10 issue.

R. A. WILLE
Allegheny Ludlum Steel Corp.
Brackenridge, Pa.

NEW PRODUCT DESIGN

Sir:

In an issue of your publication, the latter part of 1946 you published an article by G. K. Hendrick, entitled "So You're Designing a New Product!" Will you please advise the issue in which this article appeared and whether reprints are available.

D. V. EDGAR
Standards Engineer
Mills Industries, Inc.
Chicago

● Oct. 31, 1946, p. 36.—Ed.

CAPITAL GOODS

Sir:

In connection with some research work which we are doing here in the field of sales forecasting, I am interested in obtaining back data on your statistical series entitled "Capital Goods Activity." This data would preferably be on a monthly basis covering as much as possible of the period 1923 to date. Thank you for

Down to the Sea—For A Ship



The Dravo Corporation Neville Island Shipyards can tell you there's plenty of work for Plymouth Locomotives before it's anchor's aweigh for the Navy! The Plymouth pictured here is moving a destroyer escort boiler to the outfitting dock during the height of the Navy's shipbuilding program.

Dravo reports: "When this photograph was taken, our three locomotives were operating over eight miles of plant track on a 24-hour basis. They moved between 600

and 800 carloads of inbound and outbound freight in an average month."

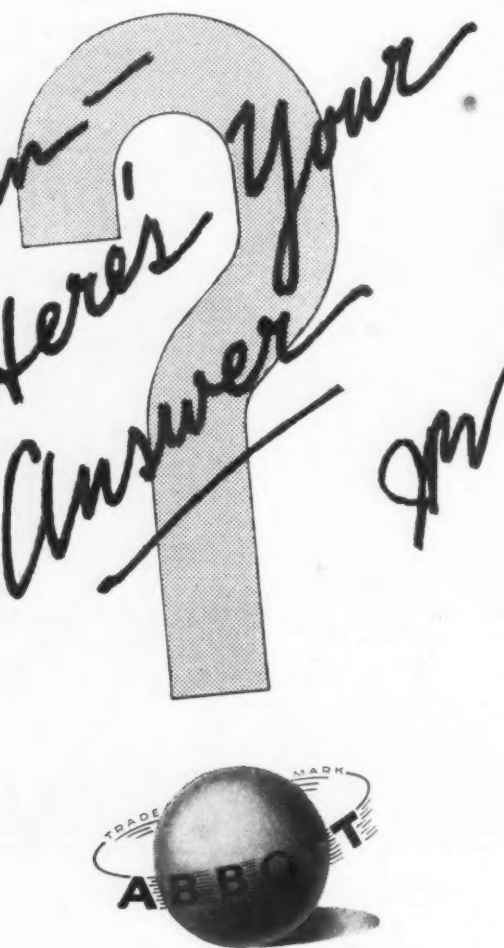
Here's a case history for others seeking economical and dependable intraplant transportation for big-size, hard to handle loads. Plymouth Locomotives—in standard or narrow gauge models, gasoline, diesel mechanical or diesel electric powered—are designed to answer virtually any track haulage problem; now and for years to come. For full details write Plymouth Locomotive Works, Dept. A-2, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

*Jim—
Here's Your
Answer*



BUT AN END TO YOUR QUESTION . . .

**SPECIFY "ABBOTT"
BEARING BALLS**

THE ABBOTT BALL COMPANY HARTFORD, CONN. U. S. A.

any information you may be able to forward to us along these lines.

FRANCIS C. STACEY
American Optical Co.
Southbridge, Mass.

● The series was published from June 13, 1935, through Aug. 7, 1941. We are forwarding copies of graphs that appeared in these articles which we hope will be of help to you. Should you require further information photostats could be made from our bound volumes; no other copies are available.—Ed.

FLOATING PLASTIC TUBES

Sir:

In your June 17 issue in Newsfront, there is a paragraph on the subject of floating plastic tubes. We are very much interested in this subject and would appreciate your advising us where we might receive detailed information in connection with such tubes.

HARRY M. SPECHT
Eastwood-Nealley Corp.
Belleville, N.J.

● The article, "Plastic Tubes Cut Plating Solution Loss," published in the June 26 issue, p. 44, gives added details.—Ed.

CRAWFORD RANGE

Sir:

We have in our kitchen a Crawford range which has been manufactured in the U. S. and we would like very much to know where the stove is being manufactured now and the spare parts for it. We believe it is a factory near Boston, so we hope you can give us their name and address.

RAOUL LASSONDE
Tote Gaufree "Ideale" Enrg.
St. Hyacinthe, Quebec

● Walker & Pratt Co., Watertown, Mass., manufacture Crawford ranges.—Ed.

TOOL STEEL DIRECTORY

Sir:

Please forward 6 copies of the 19th revised edition of "Directory of Tool Steels."

A. E. KELLER
Advertising Manager
Carpenter Steel Co.
Reading, Pa.

● The 19th revised edition is available to subscribers at \$2.00 each for one or two copies; \$4.50 for three copies; \$1.00 each for six or more copies.—Ed.

CAR WHEELS

Sir:

It runs in our mind that some several months ago you ran an article describing methods of rolling steel car wheels. We would greatly appreciate having a copy of this article.

ROBERT R. STEPHENS
Robert R. Stephens Machinery Co.
St. Louis

● Probably you refer to the article "Say Severest Freight Car Shortage Will Hit Nation in Summer," appearing in the Mar. 13 issue, p. 108.—Ed.